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SELECT
DISSERTATIONS
ON SEVERAL SUBJECTS
OF
MEDICAL SCIENCE.

BY
SIR GILBERT BLANE, BART.

FELLOW OF THE ROYAL SOCIETIES OF LOND. EDINB. AND GÖTTIN.
OF THE IMPERIAL ACAD. OF SCIENCES OF ST. PETERSBURGH;
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PHYSICIAN TO THE FLEET IN THE WEST INDIES AND NORTH
AMERICA IN THE LATTER PART OF THE AMERICAN WAR;
ONE OF THE COMMISSIONERS OF SICK AND WOUNDED
SEAMEN DURING PART OF THE LATE WAR; AND
PHYSICIAN TO THE KING.

A NEW EDITION.

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IN obedience to the expressed wish of the venerable Author, his Family present these pages to the Public. Several of the Dissertations had been revised by him, and that which stands last was just written, and the concluding emphatic words added, when a sudden and severe illness put a stop to his task. The intelligent Reader will immediately discern those Essays that have had the benefit of his revision, without enumeration here. Under these circumstances, indulgence is craved for any deficiencies which the scrutinizing and philosophic mind of the Author would, in its pristine vigour, have supplied.



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TO

THE KING.*

SIRE,

I HAVE been induced to solicit the sanction of YOUR MAJESTY'S Name to this work, from reflecting, that the subjects of it have arisen either out of a course of public duty, in which it was my lot to witness, and to act an humble part, in some of the most splendid events of British History, or during a period in which I have had the honour of being engaged in the service of YOUR MAJESTY'S Person and Family. In the exercise of these and other duties of a profession, which has for its end the alleviation of human suffering, and the saving of human life, it has been my aim, to the utmost of my inadequate powers, to extend its utility, and uphold its dignity, by founding it on the deep and solid basis of genuine science and sound philosophy, as the most acceptable service I could render to a Monarch, who, as He is the Father of his People, so is He the object of their veneration and affec-

* His late Majesty.

DEDICATION.

tion. And I count it one of the most happy incidents of my long life, that, in addition to all the ordinary motives to the discharge of my duty, I have felt my labours sweetened, and my exertions animated, by the further incentive of rendering myself, if possible, not unworthy of the distinguished confidence and encouragement of a Sovereign, who is the Patron of Literature and Science, as well as of all the useful and liberal Arts—of a Sovereign, also, by whose wisdom and vigour, seconded by the matchless energies of a free, a loyal, a virtuous and valiant nation, Europe has been rescued from subjugation and oppression, through a series of achievements, which in lustre and effect surpass whatever has been recorded in the annals of the world.

I entreat YOUR MAJESTY to accept this tribute of the homage and attachment of

YOUR MAJESTY'S

most faithful, most devoted, and

dutiful Subject and Servant,

GILBERT BLANE.

London, November 15, 1822.

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PREFATORY DISCOURSE.

IT is my intention in the first Article of this work to state the improvements in health which have taken place in the British Navy, in the course of the last fifty years—by what means they have been effected,—and what further improvements, if any, may be still practicable in this department of the public service, as one of the most grateful offerings I can make to my country at the close of my life.

My means of knowledge have been derived from having engaged in this service at the end of the year 1779, at which time I embarked on board of the Sandwich of 90 guns the flag-ship of Lord Rodney, who sailed from Spithead on Christmas eve of that year, with a force consisting of twenty-one ships of the line and six frigates, convoying a fleet of victuallers, storeships and transports, for the relief of Gibraltar, then closely blockaded by sea and land. The Admiral, after splendidly effecting this, was pleased to appoint me Physician to the Fleet under his command, the ulterior destination of part of which was to the West Indies, on which station and that of North America, I continued to serve in that capacity till the treaty of peace in 1783. My further opportunities of acting in this department arose out of

my appointment to the place of Commissioner of Sick and Wounded Seamen in the year 1795, in which I continued till the year 1802.* But having either from nature or education and example, imbibed early in life, exalted feelings and conceptions of public duty, and particularly in all that relates to the Naval Service, I have devoted a large share of my time and attention to the study of what belongs to it, in the intervals of those duties during which I had no public appointment, except being sent by the Cabinet Council on a mission to the Island of Walcheren in 1809, to examine and report on the condition of the great army there, labouring at that time under a state of unexampled sickness from a raging endemic malady. I have no right however to lay claim to a disinterested attachment to these studies and pursuits, having in common with other public servants of this, above all other countries, amply experienced whether in peace or war, the countenance and bounty of my King and Country, to whom I still hold myself indebted; nor can I allow those labours, which I owe to the public on the score of duty and gratitude, to be classed among the works of supererogation:—The incidents in my narrative which did not fall under my own observation have been derived from the most authentic documents and records.

* The fruits of my experience in this course of service will be found in a work entitled "Observations on the Diseases of Seamen," Lond. 3d. Edit. 1798.

Before entering on the subject in the limited period which I have prescribed to myself, some account of it in former ages, and among other nations, will throw much curious and important light on it, as compared with the state of it in our own age and country.

It has been the remark of all ages, that a life at sea, is through the difficulties, dangers, and hardships inseparable from it, more removed than any other from the ordinary course of human life. Homer says,

’Ου γὰρ ἔγωγε τι, φημὶ, κακώτερον, ἄλλο θαλάσσης
’Ανδρα τε συγχεῖναι εἰ καὶ μάλα καρτερὸς εἴη.*

Hom. Odyss.

and Horace in a passage familiar to every scholar thus denounces a life at sea:—

“ *Illi robur et æs triplex*”—

But how greatly have these evils, repulsive as they are, been compensated, by calling forth some of the most exalted virtues and talents of our nature, awakening those high capacities which could only find a field in the cultivation of those moral, physical and intellectual attainments, which have empowered man to assert his dominion over the habitable world, enabling him to establish an intercourse of every part of it with every other part, and even to encompass the planet assigned for his habitation.

* Thus translated by Pope.

“ Dire is the Ocean, dread in all its forms,

“ Man must decay, when Man contends with Storms.”

Were we to be favoured with a transient visit, by a well educated inhabitant of the Moon, or other planet or satellite, who should be desirous of learning, in as few words, and as little time as possible, the utmost reach which human reason has attained in the prosecution of Art and Science, this could not, assuredly, be more succinctly and effectually done, than by carrying his attention from a savage tribe with their canoes to a great and cultivated nation, with a first-rate Man of War fully equipped and under way, this being beyond doubt the most superb engine that the mind of man has ever conceived, or his hand ever executed, and affords the fullest display of that progressive improvement of intellect which distinguishes rational beings from mere animals.

We read of commerce being carried on, and armies being transported in distant times by ships, but so imperfect was the art that they hardly ventured out of sight of land, and though our remote ancestors availed themselves of some knowledge of the stars, this was merely for the purpose of ascertaining bearings, without involving the application of Mathematics. A great advantage they had indeed over us, was that they did not possess the means of keeping the sea long enough to create disease ; for their voyages continued by far too short a time, either to engender fevers by filth and foul air, or to induce scurvy by tainted or scanty food. These, in truth, were not evils

attending the rude ages of navigation. The descriptions which we have of scurvy, by the ancients, is of that which broke out in the Roman armies in Germany, as recorded by Pliny and Tacitus. And it makes its appearance in garrisons in modern times, as I witnessed in that of Gibraltar at the time of its relief in 1780.

The Mariner's Compass became known in Europe at the end of the 13th, or beginning of the 14th century, but it was not efficiently employed even in the coasting trade of the European Seas, till about the year 1420, under the auspices of John King of Portugal, or rather the enlightened and enterprising spirit of his son Prince Henry, at which period, Navigation was much indebted to Roderic and Joseph, two Physicians of that Prince for their great improvement of the * Astrolabe. It went on improving in the course of that century till Columbus was inspired with sufficient confidence to attempt the crossing of the Atlantic, which he achieved in 1492.

Then began the race of Scientific Navigation in which the British Nation has outstripped all others, insomuch that the boast of the Emperor Charles the Fifth, that the sun never set on his

* An instrument which, though rude and cumbersome compared with the quadrant and sextant, into which it was converted by a long series of improvements, proved a very valuable auxiliary to the compass by ascertaining the latitude, though with no great precision.

dominions, may in the present day be more substantially applied to the person of the British Monarch. And by the same rule, the saying of Tacitus “that whatever power acquires the mastery of the Sea, will also hold the dominion of the land,” is also at this moment verified in its most literal, and comprehensive sense. And what can be more curious and interesting than that the same spot of the globe, which at the period of the Christian æra, was held by the polished nations of antiquity, to be the country of a nation out of the pale of the civilized, and almost of the known world, *penitus toto divisos orbe Britannos*, and characterized as more barbarous and inaccessible than that of the Scythians and Africans, should be the region occupied by a people whom we have seen in our own times ruling the destinies of nations, wielding the trident and swaying the sceptre of dominion in every quarter of the globe. And what is most marvellous and admirable in all this, is that this ascendancy has been acquired through the facilities afforded by those very gulphs, seas and oceans, which had been deemed the insurmountable barriers that rendered our country inaccessible to other countries, and other countries to ours. Nay, their *Ultima Thule* one of the British Isles, was believed as inaccessible by them as the North Pole is by us; and may not our posterity after having reached it, (as they no doubt one day will) look down upon us as

quite as much inferior in nautical skill, as we now look back on our ancestors a thousand years ago ?

As it is to Navigation therefore that Great Britain owes both her naval and commercial greatness and her military renown, what can be so important as to remove and avert whatever tends to impede its progress ? And it may be affirmed with truth, that ever since those long protracted voyages which were rendered practicable through the invention of the compass, and astronomical instruments, together with the application of mathematics to the improvement of navigation, no impediment so serious and appalling has stood in the way of mankind in reaping the fruits of such unexampled ingenuity and hardihood, as the disastrous mortality and sufferings which were at one time thought so irremediable and insurmountable, as likely to baffle and render unavailing all previous improvements. In proof of this I shall mention a few of the facts to be stated at greater length in the subsequent part of this article.

Vieyra, a Portuguese historian of the early expeditions of that nation in pushing their discoveries on the coast of Africa in search of India, for want of plain words sufficiently impressive, delivers himself in the following figure of speech ;
 “ If the dead who had been thrown overboard
 “ between the Coast of Guinea and the Cape
 “ of Good Hope, and between that Cape and

“ Mozambique, could have tomb-stones placed for
 “ them, each on the spot where he sank, the whole
 “ way would appear one continued cemetery.”

Sir Richard Hawkins, the great navigator, who lived in the time of Elizabeth and her successor, relates that, in the course of twenty years he had known of ten thousand seamen having perished by scurvy alone. In order to estimate this duly, we are to bear in mind that the marine of England was, in that age, little more than a twentieth part of its amount in the time of the late French Revolutionary war.* Between that and our own

* See the annexed Table, a document of great interest and curiosity.

List of the English Fleet in the in Reign of Queen Elizabeth.

No.	Title of the Ships.	Tonnage.	No. of Men in Port.	No. of Men in Service.	Mariners.	Gunners.	Soldiers.
1	Triumph	1000	30	500	340	40	120
2	Elizabeth Jonas	900	30	500	340	40	120
3	Beare	900	30	500	340	40	120
4	Du Mer l'Honneur	900	30	500	340	40	120
5	Victory	800	17	400	268	32	100
6	Arke Roiall	800	17	400	268	32	100
7	Mary Rose	600	12	250	150	30	70
8	Hope	600	12	250	150	30	70
9	Eliza Bonadventure	600	12	250	150	30	70
10	Golden Hynde	500	12	250	150	30	70
11	Garland	500	12	250	150	30	70
12	Nonparielle	500	12	250	150	30	70
13	Defiance	500	12	250	150	30	70
	Carried forward	9100	238	4550	2946	434	1170

times, losses equally great, and the total miscarriage of expeditions, owing to diseases at sea,

No.	Title of the Ships.	Tonnage.	No. of Men in Port.	No. of Men in Service.	Mariners.	Gunners.	Soldiers.
	Brought forward	9100	238	4550	2946	434	1170
14	Vanguard	500	12	250	150	30	70
15	Rainbow	500	12	250	150	30	70
16	Dreadnought	400	10	200	140	20	40
17	Swiftsure	360	10	180	120	20	40
18	Antilopp	340	9	160	114	16	30
19	Swallowe	300	9	160	114	16	30
20	Foresight	300	9	160	114	16	30
21	Ayde	240	6	120	88	12	20
22	Quittaunce	160	6	100	76	12	12
23	Anorswire	160	6	100	76	12	12
24	Crane	160	6	100	76	12	12
25	Vantage	160	6	100	76	12	12
26	Bull	160	6	100	76	12	12
27	Tyger	160	6	100	76	12	12
28	Tramontana	130	6	70	52	8	10
29	Scoutt	120	5	70	52	8	10
30	Acates	100	4	60	42	8	10
31	Popingay	100	3	60	42	8	10
32	George	80	3	24	20	4	10
33	Galley Bonabaglia	100	4	50	30	8	12
34	Charles	70	4	45	35	4	6
35	Moone	60	4	40	30	4	6
36	Spie	60	4	40	30	4	6
37	Aduyce	60	4	40	30	4	6
38	Merlion	60	4	40	30	4	6
39	Sunne	30	3	30	25	3	2
40	Cygnat	20	2	20	16	2	2
41-6	Six Boates	—	6	180	174	—	—
47	Frigate	20	2	35	—	—	—
48	French ditto	20	2	35	—	—	—
49	Gennet	200	2	—	—	—	—
		14230	413	7469	5000	735	1668

The total seamen and combatants therefore in this great armament was somewhat more than one-20th, for the whole

could be quoted from history, and even in the memory of man. For in 1742, the crew of the *Centurion*, of 50 guns, in which Anson made his celebrated voyage of circumnavigation, was so weakened by scurvy, that only eight men were capable of doing duty, and then so reduced in health that, had the ship been compelled to keep the sea a very few days longer, it would not have been possible to have brought her to an anchor at Juan Fernandez, and she must have gone adrift in the Pacifick Ocean, the survivors perishing miserably, as once happened to a Spanish ship in the same ocean, under the like circumstances. And such was the ignorance of the times, that the classical and scientific compiler* of this voyage gave it as his opinion, after most deeply and eloquently deploring its disasters, that the sea-scurvy was a disease, for which there never had been,—and never could be,—any remedy discovered.

In proof of disasters still later from neglect of health, I may quote the service on the windward station of the West Indies in 1780, when I found,

on service and in port, multiplied by 20, would amount to 157,640; whereas, the greatest number of seamen and marines voted any one year in the late war was 140,000. But it is material to remark, that a considerable proportion of the men as well as ships was taken from the merchant service on the spur of the occasion, which was no less than that of repelling the Spanish Armada.

* Mr. Robins, the celebrated mathematician and engineer, was generally believed to have been the Editor of this Work.

on entering on my duty, that in a fleet manned with between 7 and 8000 seamen, the mortality had been one in seven the preceding year.

I will not here abandon my reader to the painful feelings arising out of such reflexions, but will quote, though somewhat out of place, a few consolatory incidents.

It appears from the statistical exhibition in Table I. of the Appendix to this article, that the mortality of Naval Hospitals in all parts of the world was in the proportion to the number of seamen and marines voted as one to forty-two,—that in the middle of the revolutionary war, it was as one in sixty-two,—at the end of it, as one in one hundred and forty-three ! This great decrease of mortality could be ascribable to no other cause than better medical treatment, and improved management in various points, particularly those of cleanliness, ventilation, and diet ; and it is still more in favor of this view of the case, that a large proportion of the sickness in the West Indies in the revolutionary war, was chargeable to the yellow fever which prevailed in a very limited degree in the American War. And it is deducible from *data*, stated in the same Table, that if the rate of mortality had been the same in the Revolutionary, as in the American war, there would, in the course of its twenty years duration, have died at Hospitals, in all parts of the world, between 47 and 48,000. And if to this are added

the numbers who perished annually on board, calculated on the average of * Table VI. in the Appendix at 4,453, the total amount of mortality in that war would not have been less than 137,500. Now, could this country, or even all Europe, in its then depressed state of commerce have supplied the vacuum made by this waste of life in the stock of seamen? Money has been called, by what has been considered an apt enough metaphor, the sinews of war : but necessary as this is, there is a species of treasure, consisting, in the proper sense of this word, namely, the sinews of living human beings, in default of which, money could be of no avail. And it is appalling to reflect what would have become of us had not certain means been discovered for husbanding the invaluable stores and magazines of human life.

I shall next mention the sudden extinction of scurvy by lemon juice. The general distribution of it was made in 1796. In the following year Earl Spencer, the First Lord of the Admiralty, paid a visit to Portsmouth, chiefly with a view to the regulation of discipline, and of the dock-yard ; but before leaving the place, being desirous of seeing the sea scurvy, so notorious in maritime

* It is greatly to be regretted that this excellent order should already have gone into desuetude, as it would be a matter not merely of rational curiosity, but of great practical utility to know the rate of mortality, and the class of diseases, in their annual fluctuation.

history, he visited Haslar Hospital for that purpose. Such however had been the rapid effect and benignant influence of the remedy, that there was no specimen to shew him. And it is not easy to conceive any thing more enviable than his Lordship's feelings must have been on this occasion, when he reflected that this was ascribable to a remedy first supplied under his own direction. In short, the efficacy of it has been so complete, that scurvy may be pronounced a disease now unknown in the Navy; and many of the surgeons well advanced in life have never seen it. The gradually declining sickness in the Navy in times of war is also proved by this, that the total sick sent on shore to all the hospitals, and other accommodations in the three kingdoms in the third year of the American war, amounted to 30,000, whereas in the third year of the Revolutionary war they amounted only to 16,860, being little more than one half of the other. And as the fleet called the Channel fleet, for our domestic protection, was at all times pretty equal, the comparison is fair.

I shall conclude with another brief statement equally consoling to the benevolent and patriotic heart. In the year 1779 the Channel fleet, after a cruise of ten weeks, put on shore to the hospital two thousand four hundred men ill of scurvy. There were besides these a number of slighter cases retained on board, and others accommodated in

huts and tents in a field adjacent to the hospital, which was so full in consequence of the great sickness of the preceding year, during which, besides other diseases, more than five thousand cases of fever were sent to the hospital, a thousand remaining on board. And an idea may be formed of the intensity of the sickness in these two years from considering, that though the hospital contained eighteen hundred regularly appointed beds, four hundred more patients were crowded into garrets and passages ; a great number were sent to an hospital at Gosport, originally intended for prisoners of war, a number were provided for in sick quarters, and two large ships were fitted up for the reception of convalescents.*

Let this state of things towards the beginning of the American war be compared with that in the seventh year of the Revolutionary war. In the year 1800 the Channel fleet kept the sea off Brest for four months without one of them being in port ; and when they did all return into port in September of that year, there were in the whole fleet only sixteen subjects for the hospital !

But in order to complete the comparison at intervals in the last fifty years as has been promised, we have to state what has been the rate of health in the period elapsed from the peace of 1815, to to the present time, 1830.

This will perhaps be best done by placing in

* See Dr. Lind's Letter in the Appendix.

one series, with what has been already stated, the results of the several comparisons since that time, which, by calculations founded on materials carefully extracted from authentick public documents, in which the author has been assisted by the judicious labors of the present Medical Commissioners of the Navy, turn out as follows :

In 1782. Under a Parliamentary vote of 100,000 Seamen and Marines, the proportion of men sent to Hospitals from ships of war in all parts of the world has been that of - - - - - 1 in 3.3

In 1795. Under a vote of 85,000 Seamen and Marines in all parts of the world, the proportion was found to be that of - - - - - 1 in 4

In 1813. Under a vote of 140,000 Seamen and Marines in all parts of the world, the proportion was found to be that of - - - - - 1 in 10.75

In 1819. Under a vote of 30,000 Seamen and Marines, the proportion in all parts of the world was found to be that of - - - - - 1 in 8.8

In 1829. Under a vote of 30,000 Seamen and Marines, the proportion in all parts of the world was found to be that of - - - - - 1 in 8.3

So that the sickness of the Navy is not now much more than one-third of what it was near

fifty years ago. One of these five statements is towards the end of the American war, two of them during the Revolutionary war, and two of them since the peace of 1815. It may be objected with truth, that the large round numbers in the numbers so voted, being different from that of those actually employed, there is a want of precision in the inferences. To this it is answered, 1st. That as the numbers are relative and not absolute, the error runs through the whole so equally as not to affect the practical result. 2nd. By inspection of these Tables, which are here annexed, as compared with the tables of deaths on board of ships, as exhibited in another, it appears that the difference is only about that of one in forty-seven. But whoever wishes for more precision, may apply to the tables as here exhibited, and may also ascertain the rate of mortality. The table is here also exhibited at full length, for the purpose of shewing the inequality of the sickness and mortality in different years. This inequality was owing to the unequal prevalence of the Yellow Fever in different years, and is particularly remarkable in the year 1820, (vide the Table) when this pestilence prevailed most calamitously on board of the *Iphigenia*, and other ships of war, stationed that year at Jamaica. But this inequality cannot be entirely accounted for without taking into the account the different opinions which existed regarding infection, for

the neglect of preventing personal intercourse between the sick and the sound, could not fail to give a wider spread to this direful malady more at one time than another, according to the fluctuation of opinion.

An Account of the Number of Seamen Voted in each Year, between the 1st of January 1816, and the 31st December, 1829, and of the Number of Sick sent to Hospitals in all parts of the world.

Year.	Number of Seamen and Marines.		Dead.
	Voted.	Sick.	
1816	33,000	4006	319
1817	19,000	3224	264
1818	20,000	3538	247
1819	20,000	3375	275
1820	23,000	3564	362
1821	22,000	3114	197
1822	21,000	3061	164
1823	25,000	3075	213
1824	29,000	4114	214
1825	29,000	4198	331
1826	30,000	4037	224
1827	30,000	3906	223
1828	30,000	4093	195
1829	30,000	3611	282

I am confident my reader will thank me for this brief statement, in which I have been prematurely impatient in serving him up such a supreme mental luxury ; for what I have set before him

must warm the heart, and afford the utmost delight to every good man, to every loyal and patriotic subject.

I now proceed to detail through what means the dangers and hardships of seafaring life have been diminished,—the horrors of war mitigated,—how this branch of the public service can now be carried on with the saving of myriads of human lives, millions of treasure to the nation,—by what means one ship of war is now, in efficacy of service, equivalent to two* of the same rate less than fifty years ago,—and in which it will be seen that all other improvements would have been nugatory without that of the improvement of health.

* In the former edition of this work I stated, that on a gross computation, I believed that the annihilation of scurvy had rendered two ships equivalent to three ; but on mentioning this to a more competent judge than myself, that excellent man and distinguished officer Admiral Sir James Saumarez, he said that on the best estimate he could form, the efficiency of the Navy was doubled by the late improvement of health, more particularly from the annihilation of scurvy ; for whereas a fleet in former times could not keep the sea more than two months, and being then compelled to come into port, the protection of the country demanded another fleet of equal force to relieve it, the same fleet, under the present improvements, comprising copper bottoms, Lunar observations, and absence of scurvy, can keep the sea for an indefinite length of time without any such relief being required.

DISSERTATION I.

On the Comparative Health of the British Navy during the last Fifty years, commencing at 1779, and terminating at 1829.

It appears from Table II. in the Appendix, that the most sickly years in the whole series were those of 1779, and 1780. This will be accounted for by referring to Table III. and to the very intelligent and elaborate account of the sickness of these years in Illustration II. with which the Author was favoured by Dr. Lind (the worthy son and successor of the Author of the Treatise on the Sea Scurvy, and other works of equal merit) joint physician with his father at that time at Haslar Hospital.* The decrease of sickness since that year has been gradual, with the exceptions of the years 1783, 1796, 1797, and 1804, (see Table II.) The smallness of the number of sick in 1783 was owing to the greater part of that year being a time of peace; for though the greater number of the ships were put out of commission before the end of the year, yet the number of seamen having been voted prospectively

* The hospital stands on a point of land adjoining to Spithead, the roadstead near Portsmouth, and the principal rendezvous of the British navy.

the year before on the presumption of hostilities continuing, it was as great * as for a year of war. In the year 1796, the sickness, instead of decreasing gradually, fell *per saltum* as it were, (see Table II.) This is satisfactorily accounted for by its being the first year in which the general supply of lemon juice took place. The increase of sickness in 1797 (see Table II.) was owing to the irregularities connected with the alarming mutiny which broke out in the beginning of that year, and was not suppressed for several months. This serves as a proof how necessary subordination and discipline are to health. The increase of sickness and mortality in 1804 (see Table I.) was owing to the prevalence of the yellow fever in the West Indies that year; for the deaths at the hospitals at Jamaica and Antigua amounted to seven hundred and twenty-seven. It appears from Tables I. and II. that there was in that year a great decrease of sickness and mortality on the European stations, which was no doubt owing to the improved methods of preventing typhous fevers.†

But the most brief and palpable demonstration of the improvement of health in the series of years under contemplation, consists in the com-

* The number voted for 1783 was one hundred and eighteen thousand, but this measure was not carried into effect, peace having been concluded in the mean time.

† See Dr. Baird's Illustration III. Appendix.

parison of the year 1779 with the year 1813, as exhibited in Table I. ; for though the number voted in the latter was double of that in the former, the absolute number of the sick was more than double, and that of the deaths nearly double.

The principal diseases constituting sickness, and causing mortality on board of ships, were Fevers and Scurvy in all climates, to which may be added Dysentery in tropical climates, and Pulmonic Inflammation in temperate and cold climates. Of these scurvy has been extirpated and fevers greatly subdued ; so that the two others may now be considered as the main scourges of sea-faring life (see Table V.)

The scurvy, a disorder incident chiefly to a sea life, but by no means peculiar to it, has been eradicated by lemon juice, or more properly the citric acid ; for the juice of the limes, Seville oranges, unripe China oranges, and in short of all the species of the botanical *genus Citrus*, or the natural order of fruits called *Hesperidæi*, possess the same virtue. The second Table was constructed principally with a view to elucidate the beneficial effects of the general supply of lemon juice. This was known to be a remedy for the scurvy far superior to all others two hundred years ago, as appears by the writings of Woodall.*

* His Work is entitled the Surgeon's Mate, or Military and Domestic Medicine, by John Woodall, Master in Surgery, London, 1636, p. 165. He concludes his praises of it by

And does it not argue a most extraordinary blindness that this important fact should have been hardly known for more than a hundred years afterwards ; when the late Dr. Lind, of Haslar hospital, revived and diffused this valuable piece of knowledge by his writings. It was this author who first * clearly stated the singular powers of this remedy in the cure of Scurvy, for Woodall only affirmed that its virtues were far superior to all other remedies. Notwithstanding this, the

saying, “ I dare not write how good a sauce it is at meat, lest the chief in the ship should waste it in the great cabin, to saue vinegar.” See a still earlier testimony in Purchas’s Pilgrim, p. 158. It would be matter of great and unaccountable astonishment to us that a piece of knowledge so inestimable should in a manner have lain dormant for a hundred and and fifty years (that is from the end of Queen Elizabeth’s reign, when its virtue was first demonstrated by Commodore Lancaster, till near the end of Geo. II. when it was equally well demonstrated on board of the Kent) did we not know that from an aversion in mankind to innovation, the like fate has befallen most other inventions however useful. Nor has this been more remarkably exemplified in any case than that of the mariner’s compass, which, as Locke observes, in his History of Navigation, was like lemon juice, known in Europe for a hundred and fifty years before being put to that obvious use by which it effected a revolution in the whole face of human affairs. Enough of other examples might be quoted, none perhaps more appositely than vaccination ; all affording a lesson not to despise the most humble intimations of nature.

* Treatise on the Scurvy, p. 153 and 543, third edit. 1772.

navy continued to suffer severely from this disease, till the order for a general supply of lemon juice. This salutary measure was accomplished by a representation from the Medical Board of the Navy in the year 1795, during the administration of Earl Spencer, from whose enlarged and benevolent mind every thing was to be expected. One of the most impressive parts of their argument was built on the report of the effects of it in the *Suffolk*, of 74 guns.* This ship sailed from England on the second of April, 1794, and an experiment was made of supplying her with a quantity of lemon juice, sufficient to serve out two-thirds of a liquid ounce every day to every man on board. This was mixed with their grog, along with two ounces of sugar.† The present

* See more concerning the first general supply of lemon juice, in *Observations on the Diseases of Seamen*, p. 490. 3rd Ed. by Gilbert Blane, M. D.

† Vice Admiral Sir T. Hardy, a highly intelligent as well as gallant officer, remarked to me, that in his voyages in the Pacific, he had discovered a new method of administering the acid, considerably preferable to the usual method, which is to give it with the sugar every day, converting the grog into punch. This the men did not like, and he found it much more agreeable to give it with the sugar in plain water as lemonade. He also believed it when given thus and in larger doses, to be more effectual medicinally. He therefore caused it to be intermitted from time to time for a fortnight, and the accumulated allowance to be given in the manner above mentioned.

regulation is one ounce of lemon juice and an ounce and a half of sugar. She was twenty-three weeks and one day on the passage, without having any communication with the land, and arrived in Madras Road on the 11th of September, without losing a man, with only fifteen men on the sick list, all slight cases, and none of them affected with the scurvy. This disease appeared in a few men in the course of the voyage, but soon vanished on an increased dose of lemon juice being administered. Let this fact be contrasted with the state of the Channel Fleet in 1780, as described by Dr. Lind (see Appendix, Illustration II.) which was overrun with scurvy and fever, and unable to keep the sea after a cruise of ten weeks only ; and let the state of this fleet be again contrasted with that of the Channel fleet in 1800, already adverted to.

It appears from the inspection of Table II. that during nine years of war preceding the general supply of lemon juice, the annual average of sick sent to hospitals was one in 3.9 of the whole men in the navy ; but that in the nine succeeding years the proportion was one in 8.4. Other causes, particularly the improved methods by which fevers were diminished, contributed greatly to this decrease of sickness ; so that it may be difficult to assign precisely what is due to lemon juice. But what admits of no ambiguity, is that ever since the year 1796, scurvy has been un-

known in ships of war and naval hospitals. It is not even inserted as one of the heads of disease in the printed form of returns, see Table V. and in Table IV. there is only one case. One of the physicians of Haslar hospital has informed the Author that he has seen but one case of it there for the last seven years ; and one of the physicians to Plymouth hospital reports, that only two cases have occurred to him the last four years. It will be seen by comparing Table V. which the Author was favoured with by the physician to Plymouth hospital, with the like Table of Haslar hospital, at the interval of twenty-six years, what great changes there have been in that time in the number and quality of diseases, and particularly in the decrease of scurvy. It is found by the inspection of a great number of surgeon's journals which I have made, that ever since the supply of this article, the scurvy has either not appeared at all, even on the longest voyages and cruises ; or if ever it did in a slight degree, it was soon made to vanish by an additional dose of lemon juice. It appears also from the same journals, to be favourable to health in other respects ; for some of the surgeons have given it as their opinion that it tends to diminish the number of fevers and ulcers. The latter are observed to be much connected with a scorbutic habit. It is true that there are instances of ulcers prevailing on board of ships in their most aggravated state since the

introduction of lemon juice, but without any connection with scurvy. These were confined to particular ships and hospitals, in which infection had either been engendered, or communicated by intercourse, or even approach; for a clean sore may be rendered a foul ulcer by the exhalations of the latter.* The increased attention to separation, ventilation, and cleanliness, has since removed this evil, than which there was none more cruel to individuals, nor more embarrassing to the service.

The latest account we have of the efficacy of this remedy since the first edition of this Work, is what occurred in the *Fury* and *Hecla*, ships sent to the Polar seas under the command of Captain Parry, on a voyage of discovery. They were twenty-seven months from England on this service, with no resources but what they carried with them. There is no instance in the history of navigation in which this has been effected without the appearance of scurvy, even for the fourth part of this time. It began to appear in the course of the voyage, but was immediately checked and subdued by increased doses of lemon juice. What is remarkable is, that it first shewed itself among the officers. It recurred in a few months, and attacked some of the sailors in both

* See *Observations on the Diseases of Seamen*, page 503, 3rd edition.

ships. It was then decided to return to England, this occurred at the island of Iglolich, in the Polar sea, in the year 1823, in N. lat. 69. The average temperature was —18.3, that is under zero. They were locked up in the ice from the 30th of October, 1822 till the 1st of August, 1823. Out of 118 men, of whom the crews of the two ships consisted, only three died in the whole course of the voyage.

Those only who have made themselves acquainted with the early part of the naval history of this country, or those who have perused the interesting, popular and eloquent narrative of Commodore Anson's voyage, in which the distresses and calamities, the dreadful sufferings and mortality arising from the sea scurvy, are depicted, can duly appreciate the value of this simple remedy. The power it possesses over this disease is peculiar and exclusive, when compared to all other alleged remedies. It is *sui generis*—*Nil simile nec secundum*—Its efficacy may also be stated as peculiar when compared to that of any other remedy in any other disease. It is a certain preventive as well as cure ; no other remedy yet known can ward off this dreadful scourge of mariners, for an indefinite length of time under the use of salt provisions ; nor does it produce any bad effects on the constitution, like some other specifics in certain other maladies. It may therefore be affirmed with truth, that it performs

not only what no other remedy will perform in this disease, but what no known remedy will effect in any known disease whatever.*

There are some other species of fruit and vegetable acids, also saccharine substances in every form, and fermenting beverages, which have considerable power in retarding the progress of this disorder for a limited time, but will not cure it under the use of salt provisions. A vegetable substance, called nopal, the fleshy and succulent stems, and stalk of *cactus opuntia*, which keeps well at sea, has been lately discovered in India to be an extremely salutary article of diet, and to retard the invasion of scurvy;† it is stated to have cured and prevented the disease; but the Author read in the Surgeon's journal of one of the East India ships, that in spite of the use of this and spruce beer at the same time, sixteen cases of scurvy arose, in one of which it was so severe as to prove fatal. All the mineral acids have been tried without effect. Had the peculiar virtue of citric acid been attended to when Commodore Anson fitted out the Centurion, and had a few gallons of it been sent on board of this ship

* The Author has never seen the scurvy resist the citric acid, and in the perusal of several hundreds of surgeon's journals, he has met with only two cases which seemed to resist it.

† See an Article on this subject in the Medical Journal of Edin. for 1809, by Dr. Anderson, Physician General at Madras.

in glass bottles, with a tenth part of spirits of wine to preserve it,* all the misery which fills the reader of this narrative with so much commiseration and horror, and which was on the point of frustrating the object of the expedition, would have been prevented.†

Foreign nations have been still more tardy in adopting this salutary practice. But we learn that they are now following our example, and that the Spaniards by means of ample supplies of the citric juices make voyages with unimpaired health of six months, against the trade winds, from Manilla to Acapulco.

There is reason to believe that there is a tendency in scurvy to break out in proportion to the number and density of those congregated in one ship or building. I have certainly remarked that it is more apt to appear in ships of the line than in frigates or sloops of war, under the same circumstances in other respects. We frequently see

* A form of preserving it with much less stowage has been practised, viz. either in the form of crystal, or by combining it with lime, and precipitating it with sulphuric acid.

† Anson sailed from St. Catherine's the 28th of January, 1741, and arrived at Juan Fernandez the 10th of June following, so that he was one hundred and forty-three days from the last place of refreshment, whereas the Suffolk was one hundred and sixty-two days under the like circumstances, without losing a man, and without having any man ill of scurvy, or any other dangerous disease, on her arrival in India.

small ships make very long voyages in good health in such a state as would create disease in large ships.

The liberal supply of fresh provisions and vegetables with which ships have been furnished while in port during the late war, has also contributed much to counteract the scurvy; for formerly this disease was not confined to long voyages and cruises. It appears from Dr. Lind's statement, that one thousand four hundred and fifty-seven men ill of scurvy were sent to the hospital from the Channel fleet in 1780, and it has been known to arise in ships while at anchor under the daily use of small beer. Nay, it has been known to arise among prisoners of war living entirely on fresh diet, and solely imputable therefore to confinement in bad air, a dull uniformity of life, depression of spirits, and indolent habits, naturally belonging to a state of captivity. This happened at Porchester Castle and Norman Cross, towards the beginning of the Revolutionary war, before those arrangements were put in practice which afterwards so effectually secured their health. The like happened about the same time in a prison ship adjoining to Porchester Castle, but it was remarked to break out sooner and to a greater degree in the ship than in the castle.* The difference was probably

* See also a curious instance of scurvy arising at land under the use of fresh provisions, in an article by Sir J. Macgregor,

owing to the *ennui* and depression of spirits, inseparable from the dreary and monotonous life on board of a ship for a great length of time, which the French, of all nations, can least endure.

The year 1796 may therefore be considered as an era in the history of the health of the navy. But there appears * to have been another sudden decrease of sickness in the first years of this century. This is to be ascribed to the improvements in the method of promoting ventilation and cleanliness, and particularly to the strict † discipline adopted and enforced in the Channel fleet. Air contaminated by foul and stagnant exhalations, particularly those from the living human body, is the ascertained cause of typhous fever, known also by the name of the jail, hospital and ship fever, which has been a more grievous and general source of sickness and mortality in the navy, than even the scurvy, being more difficult to be dealt with both in point of prevention

in the Med. and Surg. Journal of Edin. for 1805, page 282 ; also in the Trans. of the Coll. of Physic, vol. ii. and iv. ; and Trans. of Med. Chir. Society, vol. iv. page 141. There is reason to believe that the scurvy will not arise in any circumstances under the use of fresh animal food, provided fresh vegetables are used at the same time. Farinaceous food, though of a vegetable nature, will not have the same effect.

* See Tables I and II.

† See the Letter from Dr. Baird in the subjoined Illustration III.

and cure. The dysentery, which stands next in order in point of fatality, is also generated and propagated by the defect of cleanliness and ventilation.

The infection of fever is generated by the breath and perspiration of men, crowded for a length of time in confined air, and without the means of personal cleanliness, particularly from the want of shifts of linen. The methods which have of late been practised with such decided success, in combating these evils on board of ships have chiefly been ;

First. Regulations respecting personal cleanliness. A frequent inspection is made of men's clothing, to ascertain whether there is a sufficiency for the purpose of cleanliness, and of protection from cold : the regular washing of apparel is enforced, and two sets of hammocks are provided, in order that one may be scowered while the other is in use. It is a matter of sincere congratulation that the authorities which preside over the affairs of the navy, have at length listened to the many representations that have been made regarding the value of soap, in providing the means of its supply to seamen and marines, by an order bearing date May 1810. But it is somewhat to be lamented that this has not been done under the full sense of its value ; for it is directed to be supplied only on the men's requisition, and to be charged on their wages, in the

manner that has long been in use regarding tobacco. Had it been supplied gratuitously, the cost would have been reimbursed by a manifold compensation, not only in the improvement of physical efficiency, but of moral habits; for a taste for cleanliness is allied to habits and feelings favourable to correct moral conduct and discipline, conformably to that excellent English proverb that *cleanliness is next to godliness*.

The chief source of infection used to arise from the method in which new raised men were treated, by being crowded on board of small tenders and receiving ships, for a length of time before they were distributed to their respective ships. This alarming state of sickness in the American war, induced the Navy Board, over which Lord Barham then presided, to institute, in 1781, what were called *slop ships*,* on board of which new raised men were conveyed, in order to be inspected, cleaned, and supplied with new clothing before being distributed, and to be conveyed to their ships not in small tenders as formerly, but in large men of war.† It was owing to the want

* Slop is the trivial name for the various articles of seamen's clothing, such as jackets, shirts, and trowsers.

† On the 13th of March, 1787, the House of Commons called for an account of the impressed men who had died in the course of the American war, before being distributed to ships. The number returned was 180, as taken by the author from the original document deposited at the Journal-office of that House.

of such regulations that the navy used to be most lamentably infested with fevers at the commencement of wars, from the manner in which impressed men were treated, and it is from a change of system in this respect that we are to account for the much smaller degree of sickness in the year 1794, the first year of the revolutionary war, than that in 1779, in the great armaments on occasion of the war with France, Spain, and the Colonies. (See Table II.)

Secondly: the improvements in the ventilation, cleanness, and dryness of ships. The want of cleanness will hardly produce disease unless combined with want of ventilation. For this purpose there were long in use what were called wind-sails, being long tubes or cylinders, formed of canvas, eighteen inches to two feet in diameter, kept extended by hoops, and made to pass occasionally from the open air through the hatches to the parts below. This answered an excellent purpose in preventing the stagnation of foul air; but they could not be put in use in bad weather when most wanted, nor could they safely be introduced below when the men were asleep. In order to obviate these imperfections, it has been common for the last thirty years to put in practice a contrivance borrowed from a French frigate,* consisting of square wooden trunks, for which brass tubes have since been substituted,

* See Diseases of Seamen, p. 266. Ed. 3.

running from the hold or lower deck and terminating in the open air. But instead of air tubes in this situation, it has of late been judged more advisable to place a funnel vertically, near the middle line of the ship before the fore-mast, leading through the fore-castle deck. All ships are now fitted in this manner, and the great importance of it will be obvious, when it is recollected that in this deck there is neither hatchway nor ladder, and that the sleeping places are under it.—The removal of all offensive substances by sweeping and scraping, has been much more accurately attended to than formerly; but the washing of decks, particularly in cold and damp weather, has been much less practised.

Thirdly: Dryness ought to form an essential subject of attention with a view to health. For though the breathing of pure air loaded with uncontaminated moisture, such as fogs at sea, is not found to create sickness, there are great inconveniences attending the presence of the purest damp, such as the promoting of mouldiness, putridity, and rust. And the fluid proceeding from the human body has not only this bad effect, but is liable to the worst sort of corruption, being charged with recrementitious matter, which has been found in quantity by the experiments of Dr. Keil, to amount in a man in health to thirty-nine ounces in twenty-four hours. There is a further pernicious effect attending moist air, which ought

not to be overlooked. It is found that by some sort of peculiar attraction, it is a much more ready vehicle of all foreign matter, particularly of the gaseous or volatile kind, than dry air. This is palpably and familiarly exemplified by certain bad smells, such as those of common sewers, rising only in damp weather. Dryness therefore in every view is deservedly held to be a matter of primary consideration, as well with regard to health and comfort as to the preservation of the valuable articles of victualling, clothing, utensils and arms. It is effectually, promoted by fires carried about in stoves, which have been much in use for this purpose for many years.

The use of iron now so general for this, and the construction of all machinery and implements subservient to human life, has been employed in our times for various new purposes on board of ships. I remember fire places, now universally made of iron, constructed of brick and mortar, a practice in use till the end of the American war, not fifty years ago. Its use as ballast is none of the least important, for the gravel, sand, and other earthy matter, formerly in use, by absorbing putrescent matter, proved a prolific source of foul air and bad smells. Some part of the ballast has at all times consisted of small masses or pigs of iron, but at present little else is used expressly for that purpose, what is farther required to give the requisite steadiness to the ship, being made up by

the weight of the iron tanks now substituted for the lower tier of water-casks, and placed over the iron ballast. These vessels are cubes of four feet in dimensions, each of them capable of containing about two tons of water. This invention has in other respects a beneficial influence on health. Iron not being corruptible like wood, imparts no bad quality to the water, and by its durability ensures a more certain and ample supply; for the utmost distress has been known to arise from the decay of casks on long voyages and in remote parts of the world, where they cannot be replaced. The quantity that can be laid in at once in fitting out, is also more abundant than could be done by means of casks, a point of great importance to health on the long voyages and cruises, now rendered practicable by the modern improvements. A great deal of labour is also saved by this substitution; for these tanks are never removed, being filled and emptied by means of a forcing pump and a hose, and the play of the machinery employed in this operation has been known also to give occasion to severe accidents, such as strains and hernias. In proof of this there has been an incredible diminution of the supply of trusses the last few years.

Under the head of late improvements, conducive to the purity of air in ships, there falls to be mentioned another very recent and very important invention which has been adopted in their construction. This improvement was

suggested and put in practice by Mr. Seppings, surveyor of the navy, and has been explained by him in the Philosophical Transactions for 1814. The purpose of the contrivance is to add to the strength, solidity and durability of ships, and it is effected by the obliquity of the materials, and by filling up certain intervals and cavities with pieces of wood, caulked and pitched. It would be out of place here to enter into the merits of this plan, except in so far as relates to health, to which it is incidentally and collaterally conducive in a variety of ways. First, by the obliteration of those cavities under the floor of the hold which used to be the receptacles of filth and of all manner of vermin dead and alive, proving perpetual reservoirs and sources of foul air, of offensive and noxious exhalations, from the retention of moisture. Secondly, there is a circumstance in this form of construction still more favourable, if possible, to the purity and freshness of the air in the lower parts of the ship, so as in a great measure to supersede all other methods of ventilation. This consists of certain intervals left between the timbers of the frame which run up the sides of the ship, maintaining a constant communication of the open air with the hold and the spaces between decks. Thirdly, by virtue of this construction also a ship becomes less liable to leakage; so that by this and the new method of ballasting, all the unwholesomeness and offensiveness belonging to bilge-water is done away :

and it will appear hardly credible to succeeding generations, that the air in the well of a ship used in times past to become so contaminated, as in innumerable instances to produce instantaneous and irremediable suffocation. Two instances occurred to the Author's own observation at Jamaica, in the year 1782.* Two ships of 74 guns, fitted in the manner above described have lately returned from sea,† to be paid off: and it appears from their medical journals, that they have reaped every advantage with regard to health that could be wished or expected. One of them, the Albion, in the course of eleven months, during three of which she was engaged in winter cruises on the coast of America, the most rough and trying service in the world both for ships and men, had on an average no more than five on the sick list of a crew of 490 men; no infectious disorder arose; the only deaths from disease were one from pulmonic inflammation, which was by far the most prevailing complaint, and one from erysipelas; twelve were sent to the hospital,

* The Author takes some shame and remorse to himself for not then being acquainted with what is admitted to be the most effectual means of recalling sense and consciousness to those who have lost them by this species of suffocation, namely, dashing cold water on the naked body, or plunging repeatedly into a cold bath or a vessel of cold water. See Phil. Trans. 1762, in a case related by Dr. Frewen; also in the works of my venerable friend Baron Portal, in the Memoirs of the Royal Academy of Sciences, Paris. See also Annual Register, vol. 4 and 17.

† This was written in 1815.

none of which were cases of fever, flux, or scurvy. Of this small number, the only serious cases were those of small pox, consumption, and pulmonic inflammation. This ship was also fitted with iron tanks. The other, the Tremendous, in the course of twenty-two months, employed chiefly in the North Sea, had no case of fever, flux, or scurvy, and only two deaths happened, one from pulmonic inflammation, and one from inflammation of the liver; nor did any infectious disorder arise, except the mumps,* (*cynanche parotidea*), of which there were sixteen cases: the great majority of complaints were catarrhs; twelve were sent to hospitals, of which the only important cases were those of anasarca and pulmonic inflammation. Fourthly, the great increase of the strength given hereby to the bottoms of ships has been known to prevent them from foundering or stranding.

In reviewing the various ways in which these new methods of fitting ships of war affect health, it is truly pleasing to contemplate that admirable harmony by which it is made manifest that whatever is most perfect and excellent in subjects of art, as in the arrangements of nature, tends in all its bearings and influences to bring about the most salutary ends

There is still another recent contrivance, which,

* It is not uncommon for this complaint to spread in ships of war. See Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, Vol. III. p. 431.

though much less important, is in proof of the same principle, and is deserving of notice, as well from its having some influence on the purity of the air, as to demonstrate how much the human intellect is awakened and exercised in this age and country in all manner of useful inventions. What is alluded to, is the illuminators, or bull's eyes, as they are vulgarly called, consisting of thick portions of glass, in form of the segment of of a sphere, inserted in the ports and decks for the admission of light in bad weather, when all the inlets of light and air are barred up. They afford great accommodation, particularly to small ships in the day-time, by superseding the use of candles, which are dangerous from the risk of fire, and tend to contaminate the air, already too close and foul.

There are some other points conducive to health in the present arrangements of the navy, which remain to be adverted to. The chief of these are the superior and excellent quality of all the articles of victualling; the plentiful supply of fresh meat and vegetables, while ships are in port, or within reach of it, as in the fleet stationed off Brest in the year 1800; the supply of as much wine as is equivalent to one half of the allowance of spirits; the use of cocoa for breakfast, and the general practice of vaccination.

The only head of improvement still remaining to be added to the enumeration in the present system of conducting the navy with regard to

health, is the superior treatment of the sick. Before the year 1796, the surgeons supplied themselves with medicines at their own expence. In that year a gratuitous supply of the principal medicines was furnished to them; and in 1804 the whole were in like manner supplied by Government. In one of the first years of this century great additions were made to the accommodation and nourishment of the sick, such as a set of bedding for their exclusive use, and various other articles conducive to cleanliness and comfort, and essential to recovery; all of which have been since improved upon in quantity, quality, and selection, by the zeal, humanity, and good judgment of the officers, civil, military, and medical, attached to the sea service. A great improvement has also been made in the situation, fitting, and furniture of the *sick berth*, as it is called. The spot appropriated to the sick in ships of the line was formerly in the fore part of the lower gun-deck, a situation, damp, ill-aired and inconvenient. Its place is now under the fore-castle, furnished with all the requisites of an hospital, and with access to the head for necessary purposes. There are now therefore ample means of treating the diseases and wounds of men on board of their own ships, whether at sea or in harbour, which it was neither safe nor practicable to do in former times, when infection was rife, when the accommodations were unfavourable to recovery, when the supply of medicines and neces-

saries was inadequate, and when there was a deficiency of medical and chirurgical skill.

It is to this we are to ascribe (however paradoxical it may appear) the late increased ratio of mortality at the hospitals, as appears in Table I. No slight cases are now sent to the hospitals as formerly, such cases being retained and cured on board: there are now no cases of scurvy, all of which, except such as were in the last extremities, or were complicated with other complaints, recovered at the hospital.* The sea service has also profited no doubt by the generally improved state of physic and surgery, and the encouragement so judiciously and liberally afforded to the medical service of the navy, under the administration of the late Lord Melville, by additional pay and the gratuitous supply of all the medicines, which cannot fail to have attracted candidates of superior talents and education.

The causes of the improved state of health of the British navy appear therefore to consist in the ample and general supply of lemon juice, the superior attention to cleanness, dryness and ven-

* It ought further to be remarked, in justice to those who have the charge of these institutions, in order to account still more satisfactorily for this late increased proportion of mortality, that it has not been the practice for some years past, as formerly, to lodge the invalids in the hospitals on their arrival from abroad, for these, while they swelled the numbers gave a fallacious computation of mortality.

tilation, the improvement in victualling, vaccination, and superior medical treatment.

The moral effect of all these ought not to be overlooked. The encouragement administered to men's minds by kind treatment, and the anxious desire of officers to supply all their wants in sickness and in health, while they prove an inducement for good men to enter the service, cannot fail to add to that alacrity and spirit so favourable to health, and which have produced results in the course of the last twenty years, which will be proudly recorded in the annals of the country. And by a reverberated influence as it were, the contemplation of these great events, the fruits of successful valour, begets an elevation of mind still farther conducive to the sound state of the body, while it exalts and confirms those sentiments of patriotism and loyalty, which, backed by discipline and martial ardour, have so eminently distinguished our fleets and armies in the late contest. And we hope it will be admitted that the medical art has contributed its due share towards those helpful expedients and well-timed resources, by which this country has been saved, and the deliverance of Europe achieved in the late war, a war which contemplated in its combined duration, extent and importance, is perhaps unexampled in the history of the world, being no less remarkable for the momentousness of the interests at stake, and the arduousness of

the struggle, than it will be memorable for the final and complete success with which it has been crowned.

Much praise is due to the government of the country, and to the officers of the navy, for bringing about these salutary changes. It does not appear from the history of ancient times, nor of modern times till very lately, that the means of preserving the health of those engaged in war, whether by land or sea, was either studied or understood. We hear little or nothing of the medical establishments in war, among the polished* nations of antiquity, nor in the early his-

* Xenophon, Cæsar, and Polybius, who give the most minute details of war, make no mention of hospitals for the entertainment of the sick and wounded ; nor does Vegetius, in his *Treatise on the Art of War*, ever touch upon this subject, but one of his commentators mentions, that each Roman legion (between three and four thousand men) had one medical officer attached to it, and that Augustus Cæsar, in compliment to the profession, and in gratitude to his physician, Antonius Musa, under whose care he had recovered from a severe illness, decreed that these officers should in future be exempted from military duty. Vid. *Vegetii de Re Militari*, l. ii. *Godescalci Stewechii Commentarius*. Somewhat of a piece with this is what we find in Rymer's *Fœdera*, that Henry IV. of England, in equipping his expedition against France in the beginning of the fifteenth century, gave an order that those who were employed as surgeons should also serve as archers.—The most complete naval equipment we read of in the 15th century is that under Vasco de Gama, in the prosecution of his passage to India by the Cape of Good Hope, which was effected in 1497,

tory of Christendom ; far less are they to be expected among barbarous nations, whether ancient or modern. It must however appear clear to every reflecting mind, that the care of the sick and wounded is a matter equally of policy, humanity and economy. Independently of men being sentient beings and fellow-creatures, they may also be considered as indispensable mechanical instruments. But in former times they had not the attention paid to them, which would have been due even to inanimate machines of equal utility ; for there seemed to be much more anxiety about preserving arms from rusting, and

It appears that no medical officer whatever was attached to the expedition, as attested by a passage in the *Lusiad* of Camoens, when describing the horrors of the scurvy. It is thus translated by Mickle,

No sage physician's ever watchful zeal,
No skilful surgeon's gentle hand to heal.

And even in the land service 150 years afterwards, it is matter of equal surprise and mortification to find from the faint lights of history, how long those who directed warlike operations continued to be blind in point of policy, and unfeeling in point of humanity, to the sufferings of soldiers. As late as the thirty years war, that is from the year 1618 to 1648, there does not appear to have been any regular hospitals, nor any organized provision of medical and surgical skill, in proof of which it may be adduced, that Comte Tilly, the Imperial General, when wounded at the battle of Leipsic, had no professional attendants except such as he found among the practitioners of the country.

cordage from rotting, than about maintaining men in an effective state of health.* This cannot be asserted with regard to the sentiments and practices of the present officers of the navy, among whom there prevail enlightened and comprehensive conceptions of duty, arising out of a general diffusion of zeal, intelligence, and humanity; which, seconded by the like qualities in the civil authorities and the medical officers, has carried the health of the navy to a pitch, which the most sanguine well-wisher to the public welfare would not have ventured to predict forty years ago. And this great object has been attained, and is likely to be perpetuated by the prevailing idea that a sickly ship is more opprobrious to the commander than to the medical officer.

The result of this has been not only to afford a great additional number of effective hands towards the accomplishment of those great ends for which navies are created and destined, namely, public defence, and the annoyance of the enemy, not to mention that naval renown of which as a nation we are so justly proud, but to promote economy to a degree which will appear incredible to those who have not paid close attention to this subject. It has been computed, as already

* There was no article in the public instructions issued to naval commanders, respecting ventilation and cleanliness, till the edition promulgated in 1806.

mentioned, that there is now as much service in one ship as formerly in two. Here is a saving of one half of the total amount of the national expenditure, besides what is saved in the recruiting service, which has been officially calculated to amount to fifteen pounds for each man, and of hospital expenses, which are estimated at five pounds for each man. This computation is exclusive of the higher bounties which would have been necessary under the reduced stock of seamen, which a high rate of mortality would have produced. Nay, it appears clear from what has been before stated, that if the mortality during the twenty years of the revolutionary war had been equal to what it was in 1779, the whole stock of seamen would have been exhausted; in which case men would not have been procurable by any bounties however exorbitant; for it has been stated, that if the mortality of 1813 had been equal to that of 1779, the total loss would have been 137,500 men, a number very nearly equal to the whole number of seamen and marines employed in the last year of the late war.

Upon the whole, it appears that on this important subject we are warranted in indulging sentiments of joy, consolation and pride, as men, as members of a free state, and as living in an age of superior humanity and intelligence, when we consider that the advantages of a life at sea have been brought to such perfection, that making

allowance for the casualties of battle, shipwreck, drowning, and the increased mortality arising out of the pestilential diseases of tropical climates, the rate of deaths in a seafaring life is now equal if not superior to a life on shore in England among subjects of the like age and constitution. The Author founds this on a correspondence with the Equitable Assurance Office, but it cannot be calculated with satisfactory accuracy till the order for the annual return of deaths in ships on service is again enforced.

It is a matter deserving of serious consideration, how far it is possible to improve still further the health of seamen. The air at sea is more pure and salubrious than any where else. Nature therefore has done much ; and as there is abundant proof of the power of art to controul the causes of disease, there is great encouragement in attempting something further in behalf of the health and lives of this very highly valuable class of subjects.

From the examination of the surgeons' journals, and hospital returns, it appears that the chief sources of mortality in the navy of late years have been pulmonic inflammation and fevers in temperate climates, and fevers and dysenteries in tropical climates. By the returns of the hospitals at home, a specimen of which is exhibited in Tables IV. and V. it appears that pulmonic inflammation constitutes the largest head of mortality. This will further appear very striking by com-

paring the proportion of pulmonic cases in the late returns of Haslar and Plymouth hospitals, and Dr. Wilson's enumeration of diseases, with that in Dr. Lind's statement in 1780. These late cases are chiefly pulmonic consumptions, the *sequelæ* of pulmonic inflammation which had occurred at sea. The chief circumstance in a seaman's duty which exposes him to this inflammation, is his being suddenly called from the too warm and close situation in which he sleeps, to take his watch in the night upon the deck, or aloft. As this has always been the case, it may be asked how it happens that such complaints have been more frequent of late? The most rational answer to this seems to be, that, as the constitutions of seamen are now entirely free from scorbutic diathesis, and in a great measure from the debilitating influence of febrile poison, more sound and vigorous also from improved diet, cleanliness and ventilation, and at all times breathing a bracing atmosphere, they are more prone to diseases of pure inflammation than formerly. In illustration of the superior purity of cool air being favourable to pulmonic inflammation, it may be alleged that the inhabitants of Switzerland, Savoy, and Sweden, are remarked to be more liable to these than the rest of Europe. If we were to reason further upon it, an explanation might also be derived from that principle of the animal economy, by which it is found that the presence of

one disease is in a great degree incompatible with the existence of another. Whatever the cause may be, the fact is undoubted.

With regard to fevers, they are by no means subdued to the same degree that scurvy has been. In some of the last years of the late war, there occur in the surgeons' journals some examples of fever being generated and propagated in ships to a great extent. In a 90 gun-ship, cruising in the Channel in 1805, there occurred a hundred and seventeen cases of fever, five of which proved fatal. Intemperance also is occasionally unavoidable, particularly in port. In an 80 gun-ship which had been for some time at Plymouth in 1806, during which the men had indulged to excess in spirituous liquors, a fever broke out on her first going to sea, with which a hundred and six men were seized, of whom ten died. Such excesses are still more pernicious in tropical climates, and this, combined with other causes, has in the late war been productive of the most dreadful mortality. It appears, for example, from the first Table, that in the year 1804, while there was a high degree of health in the navy in Europe, there was an extraordinary loss of lives from disease in the West Indies.

It remains to point out the means of counteracting these very serious evils. And first, with regard to pulmonic inflammation, which has been imputed to the too great heat and closeness of the

places in which the men sleep, whereby they are generally in a state of perspiration when called into the open air, the utmost benefit would arise from rendering those spaces cooler. This should be done so as to avoid streams of cold air, which could easily be managed by the construction and due distribution of air pipes, such as have been already described. But when Mr. Seppings's* construction shall be universally carried into practice, no other provision for this purpose will be necessary. The extreme of cold ought equally to be avoided during sleep. Many pulmonic affections are caught by men falling asleep in the open air, on their watch. Proper clothing, particularly the wearing of flannel next the skin in cold climates and seasons, is an essential precaution against such inflammations, and it is almost unnecessary to mention that men should be induced to shift their clothes when wet, as one of the most material precautions against catarrhal affections, with which pulmonic inflammation generally commences.

Secondly. With regard to typhous fevers, it is plain that the well ascertained methods of preventing them, admit of a still higher degree of

* This gentleman was the then Surveyor of the Navy, and since better known by the title of Sir Robert Seppings, having been knighted for the great ingenuity he displayed in some new and highly important improvements in the construction of ships.

practical energy by a still more strict enforcement of separation and cleanliness. It is also evident that no degree of discipline nor internal economy can prevent or destroy morbid *effluvia*, and ensure the purity of air in a ship, till Mr. Seppings's improved construction and the new method of ballasting shall become general; nor till a more liberal supply of soap, which could not fail to promote the same good end. When this supply shall be brought about, of which there can be no doubt, in this humane and enlightened age, one half of it should consist of that sort of soap which is made with a double proportion of soda or barilla, as it answers remarkably well for scouring coarse articles with sea-water. Happy would it be could the Government of the country be made sensible of the great economy arising out of the study of health, by the saving of expence in recruiting and at hospitals, independently of other and nobler motives and considerations. On the like estimate, the expence of an ample supply of soap could not be computed at more than a tenth part of the outlay of money incurred by the injury to health induced by the want of personal cleanness.*

* So highly was this prized among the surgeons, that in their great anxiety about it, they devised a novel and ingenious method, founded on chemical science, of manufacturing coarse soap. This process consisted in mixing up the residual salt of the provisions with lime, whereby an efflorescence of

Fourthly. *The prevention of intemperance.* With regard to this, naval officers are so fully persuaded of its baneful tendency, that no exhortation on this subject seems necessary. It is only to be wished that the possibility of abusing spirituous liquors were removed, this form of fermented liquors being more adverse to health than any other, and from the comparative smallness of their volume, their abuse is more easy and their concealment is less liable to detection. Much benefit is derivable from the late practice of substituting an equivalent in wine for one half of the spirits ; and still better effects have been experienced from an entire supply of wine* to the exclusion of spirits. Admiral Waldegrave, whose virtues as a man were equal to his gallantry as an officer, instituted a well concerted comparison between the effects of wine and grog as excitors of scurvy, the result of which clearly demonstrated that the men using the latter beverage were much sooner affected with scurvy. Intoxication not only renders men ineffective while under its influence, but ruins their constitutions, excites and predisposes to fevers and scurvy, and gives occasion to soda was produced, which, compounded with the fat left in the coppers, formed soap. The service owes this invention to Mr. Copland Hutchison, so well known for some useful works on Naval Surgery.

* See a very striking example of an entire supply of wine, in *Observations on the Diseases of Seamen*, page 51 and 83. 3rd Edit.

various mechanical injuries of the most serious nature and tendency. The great proportion of maniacs * among the seamen is chiefly owing to injuries of the head received in a state of intoxication, as might be naturally expected where the brain is already in a state of disturbance.

Tea is an article universally grateful to the British population, and has to a certain degree supplanted intoxicating liquors in all ranks, to the great advantage of society. It would be wise therefore to encourage the further use of it in the navy, there being no solid objection to the salubrity of it. The modern use of tea has probably contributed to the extended longevity of the inhabitants of this country; for that it is extended is proved in a subsequent part of this volume, in a Dissertation on the Health and Population of England. To those who declaim against its supposed relaxing property, it may be answered by asking whether British courage and hardihood appear by the late exploits by sea and land less splendid than at Cressy or La Hogue; whether there is to be found in the results of the battles of Trafalgar and Waterloo, any proof of British nerves being unbraced by the habitual use of this beverage; and whether the physical and moral energies of our officers and men will not stand a comparison with those of their forefathers

* See subjoined Illustration VII.

or of their enemies, neither of whom were drinkers of tea.*

Fifthly. A great proportion of the mortality of the navy is referable to the diseases peculiar to tropical climates, particularly in the West Indies. Yet there are incontrovertible proofs that fleets may serve on this station in a state of health equal to that of any other part of the world. During the month of April, 1782, in a fleet of thirty-eight ships of the line and three frigates, manned with twenty-three thousand men, the deaths from disease were of fevers fifteen ; of dysentery seven ; of scurvy two ; of small-pox six ; of mortification one ; of consumption one ; of general debility one ; in all thirty-three ; and only ninety-seven were sent to hospitals. After the celebrated battle

* It appears from Lord Liverpool's Speech on the Agricultural Distresses, on the 26th February, 1822, that the consumption of tea had greatly increased in England the last four and thirty years, for the total in 1787 amounted to sixteen millions of pounds, but to twenty-two millions in 1821. In confirmation of the salubrity of tea, I have learned the following fact from Mr. Brown, one of the East India Company's principal officers at Canton. About twenty years ago, four ships which had sailed in company for England, discovered early in the voyage that a fraud had been practised regarding the quality of the tea with which they were freighted. In three of them the crew had as much tea as they could drink, and remained free from scurvy ; it was entirely denied to the fourth, and thirty-five of them were found disabled by this disease on their arrival in England.

of the 12th of that month, the whole of this fleet rendezvoused at Port Royal, in Jamaica, and the greater part of it remained at anchor there during the following month of June. During this month, in thirty-two ships of the line and one frigate, there died of fever an hundred and thirty-four; of dysentery fifteen; of scurvy none; of various other complaints six; in all, an hundred and fifty-five; not quite an hundred were sent to hospitals, and the majority of these were cases of fever. The mortality, therefore, was more than four times greater than it was to windward, which was chiefly owing to the three following causes:—the watering duty, on which the men caught the bilious remittent, or endemic fever of the climate; the clearing and fitting of the French prizes, then in an extremely filthy state, from which they caught the yellow, or contagious fever (*typhus icteroides*.) The writer finds, on consulting the notes which he then kept as physician to the fleet, that he first perceived the contagious nature of this fever from observing, that those men who caught it, or were taken ill after returning to their own ships, by having been exposed to the foul air of the French ships, communicated it to their medical and other attendants:—the greater facility of procuring spirituous

* This subject is well illustrated by Sir — Pym, Deputy Inspector of Hospitals, in a Work entitled, *Observations on the Bulam Fever*, London, 1815.

liquors, for intoxication, particularly with this species of fermented liquor, renders the body much more susceptible to all the causes of fever.

But the mortality of seamen in the West Indies during the American war was trifling, when compared with what it has been at different times in the course of the late revolutionary war. It appears by records kept at the Admiralty, that the naval force in the West Indies in 1804, fluctuated from nine thousand to thirteen thousand, in ships of all classes ; whereas, in 1782, in which there was a greater naval force under Lord Rodney than there had ever been before or has been since on any foreign station ; the strength of this armament fluctuated from twenty-four to twenty-five thousand men : yet, on casting our eye on Table I. it appears that there died a greater proportion in the hospitals of the West Indies in 1804 than in 1782. This statement is still stronger, when it is considered, that those who died of wounds are included in the amount of deaths in 1782 ; whereas, in 1804, there was no great action at sea. It appears from the surgeons' journals on that station at that time, that there was a proportional mortality on board of ships. In one frigate there were one hundred and seventy cases of fever, of which twenty-six proved fatal on board, beside what died at the hospital.

In order to recommend measures of future precaution, let us if possible, detect the causes of

this very great difference of sickness and mortality at different periods on the same station.

It is observable, that the mortality in fleets in the West Indies, has been by far most severe in those wars in which there were great expeditions by land, as in that against Carthagera, in 1740, and those against Martinique and St. Domingo, in the first years of the revolutionary war. There was no large army transported from England, nor any expedition of importance undertaken during the three years in which Lord Rodney commanded in the West Indies. It is to this we trace the great difference in point of health at different periods. The vessels that used to be hired for transports were for the most part very ill adapted to that service, generally over crowded ; and during their long passages, in consequence of contrary winds and other obstacles, almost all of them arrived in the West Indies in a sickly state, from stale provisions and scarcity of water ; but above all, from accumulated infection. When the typhous poison exists in a slight degree, a warm climate dissipates it ; but when in a concentrated state, it is exasperated by the heat of the atmosphere, and by the paludal exhalations which universally exist in the vicinity of West India harbours : and it has been matter of observation, that troops which were disembarked from the most crowded and infected of the transports, were those men, who though they had escaped

illness on the passage, were attacked soonest and most malignantly by the fever of the climate.* It ought else to be remarked, that the causes affecting the health of the troops in 1795 and 1796, were greatly aggravated by a fever then prevailing, generated in a ship which arrived in the islands in March, 1793, under peculiar circumstances of long protracted crowding and foul air. And it may here be further remarked, that malignant febrile infection has probably been kept up by being imported from time to time in slave ships during those ages in which this traffick existed, the circumstances in the middle passage being such as were likely to generate contagion.† The evils connected with the con-

* See a striking example of the typhous infection pre-disposing to yellow fever in *Diseases of Seamen*, p. 129; from which it appears that the yellow fever seized preferably those men who had been impressed in a state of filth from a privateer at New York, immediately before the *Formidable* sailed for the West Indies.

† See a luminous exposition of the advantages of employing King's ships in the transport service, in the speech of the late Lord Melville, in *Parliamentary Debates* for May, 1810. It is to be feared that the Abolition Act, from whatever cause it may be, has not yet meliorated the condition of the native Africans. The other nations of Europe, such as the Portuguese of Brazil, conceiving slavery to be indispensable to their agriculture, are only so far observant of its abolition as compelled by the coercion of British cruisers. They go on practising importation to the same amount, and under circumstances of

veyance of troops have in a good measure been avoided by the attention of the Transport Board, in making better regulations ; but more particularly by the employment of ships of war for transports.* This was eminently exemplified in the expedition to Egypt in 1798 ; for many of the troops, from various causes of delay and change of destination, were six months on board of ships, yet disembarked at the Nile, in perfect health. The obvious remedy of the very serious evils from the old system of transports is the observance of those rules of ventilation and cleanness which have been already amply described and dwelt upon.

The other principal cause of sickness in the aggravated misery as might be expected under their surreptitious and contraband methods, which are cruel in the extreme. It may also be feared, that under the strict enforcement of these laws the civilization of Africa may be indefinitely thrown back, by locking up the natives from all intercourse with those Christian nations from whom alone they can imbibe the first elements of morality, true religion, and protective policy. Many persons indeed of the soundest judgment and purest intentions have, from the tragical incidents that have occurred at Sierra Leone, and on the high seas, altered their opinion regarding the good policy and practicability of precipitate abolition, believing that improved regulations regarding the middle passage, and their future treatment, leading to such a gradual improvement of their benighted minds as would prepare them for freedom, would be more likely to lift them above their present degraded state, whether in the colonies or on the continent of Africa.

* See subjoined Illustration VIII.

West Indies is the going on shore, whether for the purpose of wooding or watering, whereby they are at all times exposed to the endemial miasmata; or for any other purpose, whereby they may mix with the population, and inhale the morbid human effluvia during those times in which epidemic fevers prevail. All such duties should be performed by hired negroes, against which there can be no conceivable objection but a plea of economy demonstrably false, if there is any truth in the general scope of what has been said on this subject.* It appears clearly from several incidents connected with the lamentable mortality in the West Indies in the end of the last century, and the beginning of this, that mortal diseases were contracted by seamen, not only in the wooding and watering duties, but simply by going on shore to the sea-port towns, where infection existed; for ships have been known to be exposed to the atmospheric heats of Africa, and other tropical regions, with impunity; but on arriving at a port in the West Indies, and some of the men going on shore, the most fatal epidemic immediately broke out.†

The only other remark that remains to be made

* It is with great pleasure the Author has to announce, that the plan here proposed has been put in practice since the first edition of this work, with every advantage that had been anticipated.

† There are striking examples of this in the journals of the *Amelia* and the *Arab* frigates, in the years 1804-1807.

on this subject is, that the abuse of spirituous liquors is vastly more pernicious in that climate than in cold and temperate climates. One main cause of the unexampled health of the fleet to windward in 1782, was the extraordinary vigilance exercised in precluding all access to this poisonous cordial. The Admiral carried this so far as to send armed parties round that district of St. Lucia which lies adjacent to Gros-islet Bay, where the fleet lay at anchor, with orders to break all the stills that could be found, the island being then under martial law.

Sixthly. The last means to be proposed for further promoting the health of seamen is a more ample supply of articles of nourishment for the sick and convalescent. It is not enough that they be supplied with such small messes of refreshment as are fitting and necessary for the sick bed; the list of articles already provided is well selected, and sufficient for this purpose; but there are still wanting the materials of adequate and substantial diet, adapted chiefly to convalescents. It may be answered that the portable soup answers this description; but this has never been a popular article of nourishment among seamen, nor is it sufficiently hearty, solid, or abundant, for the purpose of recruiting strength. There is a new method of preserving fresh provisions not only in an uncorrupted state, but with their sound and natural flavour for several years, which has stood the most satisfactory test of expe-

rience, and is well known to many officers of the navy as an article of sea-store. I have myself found meat preserved in this manner perfectly sound and well flavoured after a lapse of six years. This method* was invented and brought into use a few years ago by Mr. Appert. A quantity of provisions preserved in this manner, sufficient for the sick and convalescent, might be furnished at a very moderate expense, and the form of preparation is so simple, that such a compendious and cheap method of managing it on a large scale will probably be fallen upon, as to render it occasionally available to the whole of a ship's company. It is needless to repeat here not only what regards the great economy of saving hospital expence by means of these supplies, but the great benefit in tropical climates of saving the men from the dangers of being on shore, by precluding them from the opportunities and temptations of intemperance, and from the exposure to the endemic and epidemic diseases of the climate.

The means proposed for the further improve-

* This method is as follows: the meat is put into a pot, the bones being first removed, to be boiled in the ordinary way. When it is about three-fourths boiled, it is taken out and put into jars, which are filled up with broth made from other portions of the same meat. The jars are then corked, luted, and put into bags; they are next placed in a boiler of cold water, heat is applied till the water boils, and the boiling temperature is kept up for an hour; the fire is then extinguished, the water drawn off from the boiler, and the bottles or jars taken out, which completes the process.

ment of the health of the navy are therefore the taking measures for the prevention of pulmonic inflammation, farther attention to ventilation, cleanliness, and temperance, the hindering of men from going on shore in the West Indies, and the providing of a better diet for the sick and convalescent. Other minor particulars might be enumerated, such as the baking of soft bread on board of ships, which is quite practicable.* It may be doubted whether it is more salubrious, but flour requires less stowage than biscuit, and is less subject to weevil. It does not seem expedient anywise, that the whole of the bread should consist of what is soft. The author has observed elsewhere † that food of a certain degree of tenacity and hardness has a great advantage over what is soft or liquid, by stimulating and exercising the stomach, and thereby promoting the vigor and firmness of all the muscles, as is exemplified in grass and hay for horses.

The modern inventions of saving life from drowning fall naturally under this head. The first I shall mention is the strong flooring in the hold, whereby the water is excluded after the planks have been crushed to pieces by rock ; two ships of

* See *Diseases of Seamen*, pp. 138 and 284, third Edit. The late Admiral Sir Benjamin Caldwell, G. C. B. and the Hon. Sir Alexander Cochrane, G. C. B. informed me that when they were captains of line of battle ships, they found no difficulty in the baking of soft bread for their ship's companies.

† See *Elements of Medical Logick*, p. 121, 3rd edit.

war have for certain been prevented by this means from foundering. Secondly, the excellent apparatus invented by Captain Manby, is chiefly applicable to shipwrecks from stranding. But there is a simple contrivance lately borrowed from the natives of Upper India, consisting merely of a sheep's-skin or ox-hide, made into an air-tight bag, with an opening, by which it may be promptly inflated and shut, and then cast as nearly as possible to the person in peril. It would be well worth while for ships of war to have a few of these in their uninflated state, in case of an accident so frequent as that of a man falling over-board at sea.

With regard to pecuniary emolument, the medical officers of the navy met with great additional encouragement during the administration of the late Lord Melville, who became sensible how hurtful it had been to the sea service that the pay of those belonging to the army should have been so greatly superior. There are still however two points of considerable importance, in which the candidates for the navy are behind those of the army. The one is, that the former have one shilling less daily half pay: the other, that in estimating the qualification for final retirement, which requires thirty years actual employment in both services, the whole length of service in the army counts as part of that time; whereas in the navy, the whole employment as assistant, as far

as thirty years, counts only for three years. The fact is, that there is still a great preference to the army among the best qualified candidates. Now it is obvious that the service at sea ought not merely to have equal but superior professional men, for besides the peculiar value of a description of men of a limited number, and indispensable to the protection and commerce of the country, it is also peculiar to this service that recourse cannot be had on the deep sea to additional or superior skill as on land, in emergencies of great difficulty and danger.

What I have further to propose has the great advantage of not adding to the public expenditure. In the liberal classes of society, nothing tends so much to create zeal and alacrity in duty as personal estimation. It is, if I mistake not, what Mr. Burke called the *cheap defence of nations*. A young well educated professional man, at the age of 22, who, though not accustomed to what is styled fashionable society, has spent his time in what may be called the liberal and learned portion of it, finds the first circumstances of his new life of the most repulsive nature, being excluded from the society of commissioned officers, contrary to what is practised in the army, with no place in which he can employ himself in study, nor in such conversation as might be instructive to himself and others. I need not say how much a change in this respect in the condition of the

Assistant-Surgeon would take from the forbidding roughness of a sea life, and may be effected simply by admitting him to the ward-room mess; an arrangement, which rightly understood, would be advantageous and agreeable to all parties, as well as highly beneficial to the service.

The next and only other circumstance I have to mention has also the recommendation of costing nothing to the public. It is well known that there are in the army many more of what may be called staff appointments than in the navy. It would add therefore to the general encouragement of the service to render the few situations of this kind as desirable as is consistent with the good of the service. What the writer chiefly alludes to in this remark is, the present prohibition of Physicians and Surgeons of naval hospitals, dockyards, and marine infirmaries, from engaging in private practice, more particularly in time of peace. Does it not seem undeniable, and nearly self-evident, that the large proportion of spare time which professional men enjoy, could not be better employed than in doing what is of great advantage, not merely to themselves, which is the least important consideration, but to the public service, by keeping up and improving their experience, and to the civil community, to whom something seems due. In this respect also the practice of the army is opposite. Upon some invidious complaint made by the local practi-

tioners at Chatham and Fort Monkton regarding this to the late Duke of York, his answer was, "that he was very happy to learn that the medical officers of the army were in such request, and that he approved greatly of their making themselves occasionally useful to his Majesty's subjects in the neighbourhood." There is even a passage in their instructions approving of it. There has been ample proof brought that both in England and in the Colonies, the lives of respectable inhabitants have, to all appearance, been lost from the naval medical officer on the spot not daring, under the penalty of dismissal from the service, to lend his professional skill where none adequate to the case could be procured. Should it be alleged that this liberty might be abused by the neglect of public duty, the ready answer is, that if any of them should be flagitious enough to commit such a crime, the detection would be easy, and being reported by the governor, or other superintending officer, to the Admiralty, would lead to instant dismissal. It is impossible not to admire the fine sentiment of the Duke of York, in that liberal and considerate concession in favour of the community, so becoming a Prince of the House of Brunswick, who as a member of a free state and a mixed government, unequalled in the annals of the world, has been taught that the end of all government is the happiness and protection of the community at large, over whom our

monarch exercises a paternal authority. So true is it that this rigorous prohibition of private practice operates to the prejudice of the service, that some of the most highly qualified medical officers of the navy have declined accepting of the appointment to the hospitals, and more than one very eminent surgeon has lately resigned his situation in order to enter into private practice. Does it not appear from this that were there even some inconveniences and real objections from the permission of private practice, it would be politic to overlook them. Whoever reflects on the still more momentous objects which constantly engage the attention of the supreme authorities, will not be surprised that this subject has not hitherto met with the consideration which might be expected, as it will no doubt in due time, considering the character of those who now preside in that department.

Whatever has been said with respect to the health of the navy will apply to ships employed in commerce, but not in the same degree; for in order to man the guns on board of a ship of war, there are three times as many men, including marines, as would be required merely for the purpose of navigating. Trading vessels therefore are not equally liable to the bad effects of crowding. Next to the Royal Navy, the marine of the East India Company merits attention as a great public concern. The Directors of that Company very

liberally permitted me to examine their medical records. It appears that there was an allowance of lemon juice in the service long before it was supplied to the King's ships ; but the Author was informed by the late Dr. John Hunter, physician to the East India Company, that the supply was neither sufficiently ample nor good in quality. Since the practical proofs of its utility in the Royal Navy have become manifest, an adequate stock of good lemon juice has been supplied for the use of the mariners of the East India ships, and of the troops conveyed in them, and with the same salutary effects. These ships not being so full of men as ships of war, fevers are not so apt to arise ; and there being no crowded transports nor slave ships belonging to this service, it is from these circumstances that we can partly account for our Eastern Settlements not being subject to malignant fevers like the Western ; I say *partly*, for with respect to endemial diseases, there are tendencies of particular spots, and regions of the earth to particular disorders, which are quite inexplicable in our present state of knowledge. For instance, none of the ports of the Bay of Bengal are so subject to malignant fevers as the West India harbours, though the creeks adjoining to the Delta of the Ganges are apparently similar. Batavia is the only port in that quarter of the world which can be compared to the Antilles in this respect. The swelled leg of Barbadoes and

Cochin, and the goitres of certain mountainous districts, may serve as further examples of the like local and unaccountable peculiarities. Dysentery and liver complaints, by a like peculiarity, are by far the most frequent and fatal disorders among seamen in India. The dysentery is probably owing to the vitiated and acrimonious secretions of the liver; this organ being much more liable to disease in India, at sea as well as on land, than on the Caribbean station. It is remarked in one of their surgeon's journals, that upon inspecting the body of those who had died of dysentery, he found abscesses in the livers of most of them. Early bleeding, when the strength will bear it, a free use of calomel, and purging salts, and the discreet use of opium, were found the most efficacious remedies. It is a great advantage in this service that the military forces are not conveyed in crowded transports as in the expeditions to the West Indies. The soldiers are very judiciously distributed in small detachments in the India ships, and it does not appear that on occasion of long passages by sea the deleterious poison of typhous fever has ever been generated in the aggravated degree in which it has appeared in other quarters of the world; and accounts for the several Presidencies of India never having been visited with the same dreadful scourge as our West India Settlements, though the atmospheric heat is considerably more in-

tense in the former, particularly in the Presidency of Madras.

It is therefore highly satisfactory to contemplate the many proofs of the substantial benefits that have accrued to the sea service in the last fifty years both in war and commerce, in all quarters of the world, from the zeal, humanity, and good judgment, displayed in promoting the health of seamen. It has been proved that it has given double efficacy to the national force, and therefore subtracted in the same proportion from the national expenditure. It may be alleged by those who are disposed to question this position, that it is not by the improvement of health alone that ships are enabled to keep the sea at all seasons and in all climates for an indefinite length of time. This is certainly true, for the sheathing with copper,* besides adding to the speed of ships, has proved of incalculable benefit by superseding the necessity of frequent repairs, whereby

* The following is the history of the coppering of the navy, as furnished to me from the records of the Navy Office, by the kindness of Sir Robert Seppings. The first ship that underwent this operation was a frigate, in the year 1761, another in 1765, another in 1770, four in 1776, nine in 1777. The first ship of the line which underwent it was the *Invincible*, in March, 1779, and seventeen more in the course of the same year. In the course of the two following years, the whole British navy was coppered, a circumstance so important, that it may be considered as an era in the naval annals of the country.

much time used to be wasted in harbours. Nor without this could it have been possible to have maintained the long blockades, such as that off Brest, in 1800, whereby the hostile ports were as it were sealed up, and the threatened invasions of the enemy baffled. It may further be alleged, that by means of the recent discoveries in astronomy and mechanics, ships are enabled to keep the sea in prosecution of long cruises and voyages, whether for the purpose of war, commerce, or geographical science, without losing time, and incurring danger in making land for the purpose of correcting longitude. All this is admitted. But these considerations are so far from disparaging the benefits of health, that they give it additional importance; for it is manifest, that without the supply of lemon juice, and the other means of maintaining health for a sufficient length of time, the advantages of copper sheathing, the facilities in finding the longitude by chronometers, telescopes, and astronomical tables, which do so much honour to the human intellect, particularly to the age and country in which we live, would be in a great measure frustrated. It would be of little avail that the depths of mathematical science, the elaborate researches of mechanical, optical, and chemical* philosophy, should be called to the aid of navigation, so as to co-operate so admirably in carrying it to its present exalted state

* See subjoined Illustration IX.

of perfection, unless the means of preserving health were to keep pace with these mighty improvements.

And on a review of this subject in all its extent and relations, it will appear that there is not probably to be found in the whole range of human affairs a finer illustration of the practical benefits of progressive knowledge in promoting the great interests of mankind—so that science, while it lends an aid, sheds also a grace and dignity, over the useful arts—nor can there be a more striking proof of the maxim, that humanity, like every other moral virtue, is the best policy—nor could we light on a more happy example to elucidate that subsidiary influence and mutual dependance, by which all the arts, sciences, and professions have a reciprocal bearing on each other, conspiring to bring about the greatest sum of human enjoyment, and affording a field of contemplation, in which cultivated, benevolent, and pious minds, delight to expatiate.*

* The like sentiment is thus elegantly expressed by Cicero : *Etenim omnes artes quæ ad humanitatem pertinent habent quoddam commune vinculum, et quasi cognatione quâdem inter se continentur.*

APPENDIX.

TABLE I.

Abstract of the number of Seamen and Marines voted by the Parliament for the services of the Years 1779, 1782, 1794, 1804, and 1813, respectively ; shewing the number sent Sick to Hospitals, and Discharged therefrom, with the numbers who died therein at Hospitals in each respective Year, on the different Stations at Home and Abroad.

	Sent Sick.	Discharged.	Died.	Run.
In 1779, 70,000 men voted.				
Home Station { Haslar.....	15141	11712	807	523
{ Plymouth....	6799	5736	174	96
{ Small Ports..	2286	4333	183	149
West-Indies.....	3846	2425	467	221
East-Indies .....	..	.....	....	..
Mediterranean	520	420	27	8
	28592	24626	1658	997
Proportion to the Number voted	1 in 2.44		1 in 42	
Proportion to the Sick.....			1 in 17	
In 1782, 100,000 men voted				
Home Station { Haslar	9103	7054	513	122
{ Plymouth....	4784	3813	136	21
{ Small Ports..	9022	9974	447	483
West Indies.....	5104	3502	753	342
East-Indies.....	2810	1251	337	21
Mediterranean	794	696	36	4
	31617	26290	2222	993
Proportion to the Number voted	1 in 3.1		1 in 45	
Proportion to the Sick			1 in 14.22	

	Sent Sick.	Discharged.	Died.	Run.
In 1794, 85,000 men voted.				
Home Station { Haslar.....	8949	7206	496	226
Plymouth....	4237	3790	164	17
Small Ports..	6062	7360	162	257
West-Indies	733	525	58	32
East-Indies	254	165	13	8
Mediterranean	1138	857	97	23
	21373	19903	990	563
Proportion to the Number voted	1 in 4		1 in 85	
Proportion to the Sick.....			1 in 21 5	
In 1804, 100,000 Men voted.				
Home Station { Haslar.....	1667	1251	140	2
Plymouth....	3888	3205	282	15
Small Ports..	2095	2187	203	28
West-Indies	3215	2095	825	149
East-Indies	932	592	105	17
Mediterranean.....	181	118	51	3
	11978	9448	1606	214
Proportion to the Number voted	1 in 8.34		1 in 62.25	
Proportion to the Sick.....			1 in 7.4	
In 1813, 140,000 Men voted.				
Home Station { Haslar.....	3592	3014	212	1
Plymouth ...	3563	2948	231	3
Small Ports..	2578	1868	243	3
West-Indies	2392	2212	179	6
East-Indies	462	392	72	
Mediterranean	484	478	40	
	13071	10912	977	13
Proportion to the Number voted	1 in 10.74		1 in 143	
Proportion to the Sick			1 in 13.33	

It appears, by casting our eye on this Table, how essential it is for the purpose of national existence, to husband the lives of men. The range of efficiency in the life of a seaman is between twenty and twenty-five years, so that looking at the 86000 men voted in the year 1794, at the beginning of the revolutionary war, there were not probably more than 5000 to be found among the 140000 voted at the end of it.

TABLE II.

An Account shewing the Number of Seamen, including Marines, annually voted by Parliament for three distinct and equal portions of War, with the Number annually sent Sick on Shore and to Hospital Ships on the Home Stations, during those periods.

Years.	Number of Seamen.	
	Voted by Parliament.	Sent Sick.
1778	60,000	15,978
1779	70,000	24,226
1780	85,000	32,121
1781	90,000	23,812
1782	100,000	22,909
1783	110,000	13,577
	515,000	132,623
1793	45,000	17,280
1794	85,000	19,248
1795	100,000	20,579
1796	110,000	16,860
1797	120,000	20,544
1798	120,000	15,713
	580,000	110,224
1799	120,000	14,608
1800	111,538	17,747
1801	131,538	15,082
1804	100,000	7,650
1805	120,000	8,083
1806	120,000	7,662
	703,076	70,832

It may be remarked with regard to this and the preceding Tables, that the number voted being somewhat greater than the number actually employed, the inferences cannot be pronounced accurate. But these statements being comparative, the justness of the inferences will depend on the relative, and not the absolute number. The Parliamentary vote, for the purpose of estimating the supplies being made in round numbers, there is a want of precision, but not such as to affect practical inferences. The actual number on board of ships of war in all quarters of the world in 1816 was computed at 138,324, in place of the round number 140,000. The number of men on board of ships actually employed may in general be reckoned about 2000 less than the number voted.

TABLE III.

Diseases, Wounds, and Accidents, admitted into the Royal Hospital at Haslar, in 1780.

Under the Physician's Care.	Under the Surgeon's Care.
Continued Fevers .....5539	Cutaneous Disorders 165
Intermittent Fevers..... 33	Venereal Disease 183
Small-pox..... 42	Ulcers, including Wounds
Measles 28	and Abscesses 979
Anginæ..... 3	Fistula in Ano..... 8
Pleurisy and Peripneumony 13	Fistula in Perinæo 12
Asthma..... 61	Burns 4
Cough, Pain of Side, and	Ruptures..... 3
Hæmoptoe 40	Disorders of the Testicles 16
Consumption 218	Contusions and Injuries of
Rheumatism..... 327	the Head..... 31
Lumbago 4	Contusions of the Trunk
Palsy 9	and Limbs 102
Epilepsy 19	Œdema of the Leg or Arm 4
Jaundice 1	Luxations 8
Dropsy 24	Fractures 60
Scurvy..... 1457	Erysipelas 12
Scrophula 4	Ophthalmia and Disorders of
Mania 16	the Eyes 17
Headach and Vertigo 3	Affections of the Urinary
Disorders of the Eyes 2	Organs 8
———— of the Ears 5	Amputations and Sundry
———— of the Abdomi-	Cases of Lameness 32
nal Viscera 3	
Colic 1	Total Surgical Cases.....1644
Flux..... 240	
Disorders of the Bladder.. 16	
Gravel 32	
Hæmorrhoids..... 2	In 1780 Physical Cases ... 8143
Epistaxis 1	———— Surgical Cases....1644
Total Physical Cases.....8143	Total 9787

Mem. The gross number of admissions this year, as appears by Dr. Lind's Letter subjoined, was 11732, of whom 909 died ; that is 1 in 13. The classification above, therefore, does not exhaust the whole, which, is not to be wondered at, when we consider the unexampled pressure of service, the ambiguity of cases, and the numbers accommodated in garrets, and under tents.

TABLE IV.

A Statement of the Diseases and Number of Patients admitted into the ROYAL NAVAL HOSPITAL at Plymouth, under the Care of one of the Physicians on that Establishment, in the Years 1806, 1807, 1808, and 1809; together with the Number of Deaths in each Year, during that Period.

DISEASE.	1806.		1807.		1808.		1809.	
	Rec ^d	Died	Rec ^d	Died.	Rec ^d	Died.	Rec ^d	Died.
Fever	180	37	72	14	76	16	219	22
Pneumonia	39	15	73	14	76	40	58	5
Asthma	7	..	10	1	20	6	9	
Catarrh	33	..	12	1	5	1	12	
Phthisis	94	27	57	33	83	25	74	32
Rheumatism	59	2	39	1	50	1	47	1
Vertigo	2	..	1	..	2	..	2	
Epilepsy	15	..	3	..	13	..	3	
Mental Derangement	23	..	15	..	16	..	7	
Apoplexy	2	1	1	..	..	..	1	1
Phrenitis .....	..	..	..	..	..	..	1	1
Paralysis	5	2	2	..	7	..	10	
Diarrhœa	8	1	6	1	12	3	9	
Dysentery	15	4	12	2	13	4	43	11
Hepatitis ..	10	2	11	1	17	..	12	1
Icterus	2	1	4	1	1	..	3	
Enteritis	1	..	2	..	1			
Gastritis .....	..	..	1	..	1			
Cystitis .....	..	..	1	..	1			
Peritonitis .....	..	..	2	..	1	..	1	
Nephritis .....	..	..	..	..	1	..	1	
Dyspepsia	3	..	5	..	9	..	4	
Dropsy	9	2	8	3	9	4	15	5
Debility	34	3	19	1	34	6	20	4
Gout	4	..	..	..	1			
	545	97	356	73	449	106	551	83

DISEASE.	1806.		1807.		1808.		1809.	
	Rec ^d	Died.	Rec ^d	Died.	Rec ^d	Died.	Rec ^d	Died.
Brought forward ..	545	97	356	73	449	106	551	83
Hæmorrhoids	2	..	1	..	1	..	1	
Lepra	2	..	1	..	1	..	1	
Colica .....	..	..	2	2	1	..	1	1
Tympanitis	1	..	2	..	2	..	4	
Cynanche .....	..	..	2	..	2	..	4	
Scarlatina .....	..	..	3	..	..	..	3	
Erysipelas	1	..	1	1	2	..	1	
Constipatio	1	..	..	..	1	1		
Chorea.....	..	..	1	..				
Cholera .....	..	..	2	..	1	..	1	1
Diseased Stomach..	..	..	1	..				
Incontinence of Urine	1	..	1	..	1	..	3	
Cephalalgia.....	1	..	1	..	1			
Scrofula	2	..	1	..	1			
Tetanus	1	..	..	..	1	1		
Hæmatemesis.....	..	..	2	1				
Scurvy.....	1	..	1	..				
Diseased Intestines..	1	..	2	1	1			
Hypochondria.....	..	..	..	..	1	..	1	
Gravel.....	1	..	..	..	..	..	1	
Worms.....	..	..	..	..	1	..	1	
Palpitatio Cordis....	1	..	1	..	1	..	1	
	561	97	381	78	468	108	574	85

TABLE V.

Abstract of Medical Reports for the Months of January, May, and October, 1808, and January, May, and October, 1814.

MONTHS	Royal Hospital at Haslar.						Royal Hospital at Plymouth.					
	Number now in the Hospital.	Received.	Discharged cured.	Died.	Invalided.		Number now in the Hospital.	Received.	Discharged cured.	Died.	Invalided.	
					Harbour Duty.	Unserviceable.					Harbour Duty.	Unserviceable.
<i>Fever.</i>	Jan. 1808	25	25	15	4		9	14	7	2	1	
	May	11	17	15	3		13	25	16	6		1
	October . .	3	4	4	2		5	9	3	2		
	Jan. 1814	32	24	15	2		15	15	18	1		
	May	43	51	22			70	74	19	3		
	October . .	17	13	14			7	10	14	1		
<i>Dysentery.</i>	Jan. 1808	9	10	13	2		4	2	1			
	May	4	6	1	1		..	1	1			
	October . .	26	40	23	4		1	2	2			
	Jan. 1814	13	11	7	2		3	4	2			
	May	4	5	2	2		2	2	1			
	October . .	13	12	22	2		3	4	2			
<i>Pulmonic Inflammation.</i>	Jan. 1808	38	37	14	5	..	36	34	5	6	4	5
	May	72	84	50	13	..	58	94	54	21		
	October . .	25	28	23	3	..	2	2	2	5	..	1
	Jan. 1814	111	83	36	7	4	11	10	23	1		
	May	83	77	68	7	..	17	21	8	2		
	October . .	51	35	49	10		18	22	11			
<i>Ulcers.</i>	Jan. 1808	124	44	32	1	2	41	23	4	1	1	1
	May	62	18	31	..	..	80	53	14	..	..	2
	October . .	79	26	20	1	2	28	5	12	..	1	4
	Jan. 1814	68	29	18	..	..	51	19	17	..	..
	May	36	14	17	..	..	29	15	17	..	..	9
	October . .	60	26	24			51	35	11	..	..	10
<i>Wounds and Accidents.</i>	Jan. 1808	21	14	4	..	1	22	16	7	1		
	May	15	8	8	1	1	39	12	10	..	1	1
	October . .	14	7	2	..	..	15	7	4	..	..	2
	Jan. 1814	29	11	6	2	..	56	21	7	1	..	7
	May	32	23	16	..	..	64	53	11	1	..	50
	October . .	57	33	20	1	..	29	21	9	2	..	17
<i>Other Complaints.</i>	Jan. 1808	99	49	33	3	2	141	72	34	2	5	8
	May	81	62	27	6	3	163	116	49	7	1	24
	October . .	92	60	24	5	..	99	59	52	3	9	16
	Jan. 1814	168	104	65	6	3	206	106	84	13	2	21
	May	102	87	82	8	..	260	217	102	7	..	74
	October . .	141	76	56	3	..	216	120	101	9	..	24

TABLE VI.

There were on board of Ships of War in all parts of the world,*

On the 1st of January, 1811 138,581
 1812 136,778
 1813 138,324

Died of disease, killed, drowned, &c.

In 1810 5183
 1811 4265
 1812 4211

TABLE VII.

An Account of the Number of Men Received, with the Number who have Died in the Royal Hospitals at Haslar and Plymouth, between the 1st January, 1776, and the 31st December, 1783; viz.

HASLAR.			PLYMOUTH.		
	Received.	Died.		Received	Died.
1776.....	2031	109	1776.....	1376	61
1777.....	6175	281	1777.....	2714	91
1778.....	9174	502	1778.....	5487	171
1779.....	13037	807	1779.....	4854	147
1780.....	11339	890	1780.....	7470	318
1781.....	7762	425	1781.....	5853	180
1782.....	8152	513	1782.....	3968	136
1783.....	4718	401	1783.....	2823	157
	62388	3928		34545	1261

Taking Haslar and Plymouth together, the number has been in the proportion of 1 in 20, as near as can be. The proportional deaths in each need not be specified, for this fluctuated sometimes in favour of one sometimes of the other, not from any local advantages or disadvantages, far less from any difference in professional skill, but mainly, or perhaps entirely, from the intensity of the complaints admitted, as before adverted to.

* It would be a great improvement in these returns, if the deaths from disease were distinguished from those in battle and from accident; also, if the name of the disease was specified.

TABLE VIII.

Account of the Lunatic Officers, Seamen, and Marines, sent to Hoxton House, and variously disposed of for the last Five Years of the late War.

Year.	Received.	Discharged cured.	Discharged to their friends and otherwise.	Discharged to Bethlem.	Died.	Remaining on the 31st of December each year
1809	76	10	3	43	9	112
1810	81	15	1	38	20	118
1811	85	4	3	53	16	128
1812	90	10	....	39	18	144
1813	93	17	7	55	13	140*
Total	425	56	14	228	76	

* Including the following officers; one captain, four lieutenants of the navy; three lieutenants of marines; one surgeon, one assistant surgeon, two carpenters, one gunner, one master's mate, one midshipman.

TABLE IX.

A Statement applying to the Year preceding the 1st of January
of the Year here specified.

		Borne.		Invalided.		Died.	
		Seamen.	Marines.	Seamen.	Marines.	Seamen.	Marines.
1811	{ Hospital Ships ...	147	70	460	23	158	71
	{ Naval Hospitals..	1467	345	1614	134	1110	302
	Total	1614	415	2074	157	1268	373
1812	{ Hospital Ships....	180	72	440	31	150	61
	{ Naval Hospitals..	656	137	1203	64	506	137
	Total	836	209	1643	95	656	198
1813	{ Hospital Ships....	115	43	353	1	109	52
	{ Naval Hospitals..	1265	262	693	116	690	142
	Total	1380	305	1046	117	799	194
1814	{ Hospital Ships....	157	54	122	..	68	9
	{ Naval Hospitals..	824	32	1401	192	679	152
	Total	981	86	1523	192	747	161

The Returns from the West Indies and Malta are included here.

ILLUSTRATIONS.

I.—*Page 8.*

The gradual increase of the navy since the sixteenth century, may be learnt from historical records. It appears, as already stated at page 8, that in the reign of Queen Elizabeth, the navy at the time of the Spanish armada, was manned by not a twentieth part of the naval force at the end of the late war; that the number of seamen and marines in the year of the battle of La Hogue, 1692, was thirty thousand: that during the whole course of the first and second succession wars, (the former terminating in the peace of Utrecht, the latter in the peace of Aix-la-Chapelle,) it was forty thousand; that in the beginning of the seven years' war, it was fifty thousand, and rose to seventy thousand at the accession of George III. this increase having been made on occasion of the family compact of the House of Bourbon, and continued till the peace of 1763. The numbers in the American War, and the late war, have been stated in the preceding tables. The great superiority of the late naval force will appear in a still stronger light, when it is considered that from the new methods of preserving the health of men, and of equipping ships; one ship is now equivalent to two in former times in point of efficient service.

II.—*Pages 19-24-30.*

Extract of a Letter from Dr. John Lind, late Physician to Haslar Hospital.

The annexed state of Haslar Hospital in the year 1780, will shew the diseases to which the Royal Navy on the first equipment of fleets was then liable; and by comparing it

with any statements you may obtain of it in the last war, will enable you to appreciate the effects of the improvements which have been since introduced into the navy, in correcting disease. On the 26th of October, 1778, the fleet under Admiral Keppel came into port, and before the end of December, sent three thousand six hundred sick to Haslar. This hospital contained one thousand eight hundred beds, of which one-fourth (four hundred and eighty) were in garret wards, suited only for convalescents, and restricted to about one-third the cubic space allowed for ventilation to beds in the regular wards; to receive this number of patients three hundred additional beds were placed in the lobbies to the garret wards, and many other places not before destined for patients. From this you will be able to account for its appearing in your reports from the Transport Office, that the succeeding year 1779 commenced with two thousand two hundred and seventeen patients in the hospital. What, under the severe pressure of circumstances, was adopted as a temporary measure, was afterwards during the war acted upon as a permanent provision. In proportion as this receded from the regular establishment, the recoveries became fewer and more tedious. In 1779, on the return of the Channel Fleet, under Sir Charles Hardy, into port, it became sickly; two thousand five hundred were in the month of September received into hospitals from it, and above one thousand ill of fevers remained on board for want of room in the hospitals. On this occasion the prison hospital at Forton was added for the relief of Haslar, and accommodated more than two hundred patients; it continued in this employ till the succeeding autumn, when an influx of sick prisoners recalled it to its original destination. Within four months preceding the year, of the diseases of which I am to state the account, six thousand and sixty-four sick had been sent to Haslar; and at the commencement of the year there were two thousand four hun-

dred and forty-three patients in the hospitals. Early this year a convalescent ship, the Mars, in which the patients, for the sake of holding a greater number, lay in hammocks instead of cradles, was added to the hospital establishment ; and I may state, next year another convalescent ship, the Lioness, was joined to this, the former holding four hundred, the latter two hundred men. Some relief, though comparatively but a small one, had been obtained from private quarters throughout these difficulties.

The preceding account gives the cases of patients received into the hospital during the third year of the war. Strong infection had continued during the former years on board the receiving ships, which affected the ships fitting out, and generally the fleets on coming from sea into port ; and a fleet of unusual magnitude, to which, in common with every department at the port, the hospital was disproportionate, from the strength of the enemy's combined fleets rendering it imprudent to divide, had remained collected at Spithead during a great part of the winter. The effect of this extended through the five first months of this year, and there was not afterwards experienced during the war any such fatal sickness.

Five thousand five hundred and thirty-nine cases of fever were admitted this year, of which three thousand seven hundred and fifty-five, or about two-thirds, were admitted in the first five months. The proportion of deaths to the general admissions into the hospital, was during that period as one to eight ; during the remaining seven months as one to nineteen. During the above five months also six hundred and ninety-seven died, being above two-thirds of the whole number of deaths (nine hundred and eighty-seven) which occurred that year in the hospital. Thirteen cases of pleurisy and peripneumony appear in the account ; but during spring many others occurred combined with the prevailing fever.

One thousand four hundred and fifty seven cases of scurvy are noted. This is the only instance that occurred of the Channel fleet being in any considerable degree affected with this disease. In August, after a ten weeks cruise in the Bay of Biscay, when the beer and all fresh provisions had been exhausted, Admiral Geary's fleet returned to Portsmouth with two thousand four hundred men ill of the scurvy. Many of these were cured without being sent to the hospital, of whom some were landed and lodged in tents, others were allowed to walk in the fields through the day and return at night to their ships. Some had died on board, and two or three died in landing. To others this disorder proved fatal only in one or two exhausted cases.

Two hundred and forty fluxes were admitted. They were chiefly of a chronic nature, and in patients returned from abroad.

The proportion of fevers admitted this year was less than it had been during the two former years, and therefore the proportion of other diseases increased; it amounted this year to little more than two-thirds of all the other physical cases, and the proportion of physical cases was nearly five-sixths of all the patients admitted.

Of one thousand six hundred and seventy-eight surgical cases admitted, nine hundred and seventy-nine, or much above one half, had ulcers, including a few cases of wounds and abscess.

The gross number of admissions and deaths this year, as appearing by the agent's books, were admissions eleven thousand seven hundred and thirty-two, and deaths nine hundred and nine, being in the proportion of one death to thirteen admissions.

After this period the Channel fleet became more healthy, and Haslar was not so much exposed to fevers. The state of the war which had before always required it to winter in

a body at Spithead, then admitted of being separated during winter and divided between Portsmouth and Plymouth.

Besides the sick here enumerated, many scorbutics were sent on shore from ships who were taken care of by their own people, and no account of them was taken at the hospital.

III.—*Pages 20 and 31.*

DEAR SIR,

London, the 8th of July, 1815.

I discover by referring to the log-books of the ships of the Channel fleet, under the command of the Earl of St. Vincent, that the fleet sailed from Torbay on the 27th of May, and returned to the same anchorage on the 26th of September 1800, when out of 24 sail of the line, frigates, fire-ships, &c., composing the number returned to that roadstead, we had occasion to send only sixteen patients to an hospital.

During the above cruise the fleet had not one *fresh beef* dinner, and so strictly was the station off Brest preserved, that out of a hundred and twenty-one days, one only passed without communicating with the advanced post lying in the outer road off Brest Harbour, and the commander-in-chief ascertaining the enemy's force and position. This was a mode of cruising until then unknown, and utterly unpractised on that coast, but was then of vital importance to this country, as the French army, under the command of General Augereau, was embarked on board the French fleet, and waiting an opportunity of eluding us, the destination supposed to be Ireland, that country being then in a state of great commotion. At the very beginning of the cruise, scurvy made its appearance, but by a timely supply of lemon juice was soon subdued. It was during this cruise that the commander-in-chief devoted himself most particularly to that system of improvement in the detail of the fleet,

which has subsequently by its adoption diffused health through the British navy in all climates, viz. the establishment of a sick berth, the excellent arrangement in ships's store-rooms, by which ventilation is produced, cleanliness of men's persons, cleaning of decks remote from ventilation by dry rubbing, correcting damp and foul air by burning fires, introducing seamen's dress suitable to the climate, airing beds and bedding twice a week when the weather would admit of it, &c. &c.; and of such consequence was the latter practice considered by the commander-in-chief, that he required a regular insertion of it in the ship's log, so that any deviation from this order in detached ships was liable to detection on rejoining the fleet. The introduction of these most salutary regulations so *entirely* belong to the Earl of St. Vincent, that hundreds of officers of the first character can attest, and the impartial historian record, the same. No longer do we hear of ship fever laying up ships of the line, and their services lost to the country for many months at a time.

I am, dear Sir,

very faithfully yours,

A. BAIRD.

IV.—*Page 22 et passim.*

The abuse of words has been truly stated by philosophers as one of the chief means of impeding the improvement and retarding the progress of useful knowledge. This cannot be better illustrated than by the perverted application of the term *scurvy*. Eugalenus, a Dutch physician, in the beginning of the seventeenth century, laboured to prove that the scurvy properly so called, almost all the forms of cutaneous complaints, hypochondria and various other maladies, ought to be considered as one disease, and treated accordingly. As he wrote in a confident and dogmatic tone,

in bold and specious language, he was followed by most of the eminent writers of the seventeenth and beginning of the eighteenth century, particularly Boerhaave and Willis, whose works abound with the most puerile and absurd conceits on this subject. There would have been little harm in this folly, had they not built upon it a most incongruous and pernicious system of practice.* Kramer, who was physician to the Imperial armies in Hungary from 1720 to 1730, relates that of four hundred men labouring under genuine scurvy, treated by one of the medical officers with mercury, so as to excite salivation, in conformity to the doctrines of his master Boerhaave, not one survived. This, though deeply mortifying to medical systems, is highly instructive, as an exhortation to study the rules of legitimate reasoning, the habit of discrimination, and the definite use of terms, while it ought to serve as a warning against the danger of idle speculations, gratuitous assumptions, and perverted language, so abhorrent to the simplicity and modesty of truth and nature. And has it not been chiefly owing to the attention being engrossed by scholastic sophistry and jargon, that the world was deprived for near two centuries of the

* The following sentiment of Dr. Lind, the father, on this subject is as well conceived as happily expressed. “There would indeed be some difficulty in conceiving how men of such wild fancies as were they who have been deemed the principal authors on the scurvy, and to whom we are indebted for this general name, should get into possession of that degree of fame which they have acquired, did we not perceive how much the world is disposed to admire whatever surprises; as if we were endowed with faculties to see through ordinary follies, while great absurdities strike us with an astonishment which overwhelms the powers of reason, and makes improbability even an additional motive to belief.” It would appear that there are medical, as well as religious heresies and superstitions. This passage from Dr. Lind, relating to some of the fathers of modern physic, must remind every general reader of a parallel passage in one of the ancient fathers of the church.—*Credo quia absurdum—credo quia impossibile!* Vid. Opera St. Augustini.

practical benefits of the citric acid in scurvy? This discovery, the legitimate offspring of experience and observation, was overlaid as it were, and nearly stifled by that spurious mass of presumptuous error and systematic dullness, which constituted so large a proportion of what was miscalled Medical Science, in the 17th and great part of the 18th century.

V.—*Page 21.*

As a proof how much and how long this useful discovery was overlooked, it may be mentioned, that in the year 1753, a Fellow of the College of Physicians, Dr. Addington, and an eminent practitioner of that day, published a tract on the Sea Scurvy, in which he never adverts to the superior virtue of this medicine; and when the College was consulted on this subject by the government, they recommended chiefly vinegar, (see Mead's Works) which has been found by modern experience to possess but little power over this disease. Mead approves of this answer, and recommends also elixir of vitriol, which was supplied gratuitously to navy surgeons for many years. But though this mineral acid seems to palliate some of the symptoms, such as hemorrhages, it has been found of no real efficacy in effecting a cure. The same author quotes a striking instance of the efficacy of lemon juice, but evidently held it to be inferior to other acids. The very able and accomplished compiler of Anson's Voyage says, "The cure seems impossible by any remedy or by any management that can be employed." Dr. Gallesio of Savona, in an elaborate treatise on the *Genus Citrus*, published in the year 1813, takes no notice of this most interesting property of the citric acid: and it may be mentioned, as a still farther proof of the neglect of this knowledge on the continent of Europe, that Captain Flinders, in the * Narrative of his Voyage of Discovery, published in 1814, relates, that

* Vol. I. p. 226.

when he arrived at one of the most remote points of his destination, his men were all in high health and strength, and with the fresh looks which they brought from Europe, by means of an ample supply of antiscorbutics, with which they were furnished when they left England in 1802 ; whereas, the crew of a * French ship on the like service, was much affected with the scurvy. It is also matter of some wonder, that Captain Cook's ship in the voyage of discovery to the southern hemisphere, in the years 1772 and 1773, was not furnished with this article ; for the rob of lemons and oranges with which he was supplied, has not been found to possess the same virtue as the juice. The chief causes to which he ascribed the great health of his men in that voyage, and which are so eloquently commented on by Sir John Pringle (see Phil. Trans. 1776), were the use of malt, sour krout, and portable soup, together with extraordinary attention to cleanliness and ventilation. It may here be alleged that the scurvy was in this instance prevented without the use of this vaunted specific. But it appears from the narrative, that Captain Cook was only 17 weeks, that is 119 days, on his longest cruise in search of a southern continent, which is short of the time for which ships have kept the sea exempt from this disease, by the virtue of lemon juice alone, under circumstances in which all other means had failed. Anson's voyage from St. Catherine's to Juan Fernandez was 140 days, that of the Suffolk, from England to Madras, was 162 days.

We have in the history of this remedy a striking example of the difficulties and delays which obstruct and retard the progress and adoption of practical truths.† In addition to

* The Geographe, Captain Baudin, Vol. I. p. 164, of this Voyage, drawn up by M. Peron, the naturalist.

† Among other instances that might be quoted of the neglect and oblivion, and of the future revival, of useful medicines, one of the most striking in the history of physic is that of the remedy for the

what has been already stated, it may be mentioned that, in the year 1600, Commodore Lancaster sailed from England, on the 2d of April, with three other ships. They arrived in Saldanha Bay on the 1st of August; the Commodore's crew being in perfect health, from the administration of three table-spoonfuls of lemon juice every morning to each of his men; whereas the other ships were so sickly that they were unmanageable for want of hands, and the commander was obliged to send men on board to take in their sails, and hoist out their boats. Purchas's Pilgrims, Vol. I. p. 149; and Harris's Collection of Voyages.

My illustrations regarding scurvy in this article have been taken from the Royal Navy, but I have learnt some facts regarding the private trade carried on in the Indian seas, which throws some curious and important light on the subject. One example will serve for all. I was informed by the master of a South Whaler, that in a service of thirty months

gout, which within these few years has acquired considerable celebrity; and though it has been suspected of not answering to its original character, is now regaining the public confidence. Alexander Trallian, a medical writer of Asia Minor, in the fourth century, ascribes to the Hermodactyl the same virtues as belong to the secret medicine above alluded to, known by the name of *Eau Medicinale de Husson*. It is sufficiently ascertained that the Hermodactyl is the root of the same plant as the *Colchicum Autumnale* of modern botanists; and it is also ascertained that it is to this last that the medicine in question owes its virtue.

The Author is indebted to Sir Joseph Banks, P. R. S. for the knowledge of these particulars: and Sir Joseph allows him to say that he is satisfied with the accuracy of the preceding statement, and also that he has experienced in his own person all the beneficial effects that have ever been ascribed to this medicine. He ascertained through Lady Liston, the lady of Sir Robert Liston, Ambassador to the Ottoman Porte, that Hermodactyl and Colchicum were identical. Her ladyship transmitted to Sir Joseph specimens of what still goes by the name of Hermodactyl in Asia Minor and the Greek Islands, and it was found to be a species of Colchicum.

in the Indian Archipelago, during which he was seven times in port, but never more than 48 hours at a time, there occurred no illness whatever among his men, except that two of them had the dysentery, which seemed to have been contracted by habits of uncleanness. They were amply provided with various species of fruit, and some live stock, but no lemon juice ; pumpkins were their main resource.

No stronger proof of British humanity and attention to medical police can be adduced, than the state of health of the prisoners of war of late years. In former wars, fevers of the most malignant description used to break out in their places of confinement. Some complaints having been made of the pretended ill treatment and bad state of the prisoners of war at Dartmoor in the year 1811, an investigation was instituted by public authority, from which it appeared not only that these complaints were groundless, but that these unfortunate men were treated with the utmost care, and that of six thousand five hundred and seventy-two, the number of which they consisted, only thirty-six were in the hospital, and only one had died the preceding week. It appears farther by the weekly returns made to the Admiralty, that in the course of the year 1813, the average number of French prisoners in Great Britain was sixty-four thousand six hundred and ninety-two. This was exclusive of Danish and American prisoners, and of those in foreign parts. The total number of deaths of French prisoners in all the *depôts* and hospital ships in Great Britain, amounted in the same year to one thousand one hundred and fifty-four, as appears by the same return, making one in fifty-five, as stated in the text. The following circumstances, which are entirely unconnected with their treatment, tended greatly to augment the mortality. 1st, The want of exercise, and that depression of spirits which is inseparable from a state of captivity. 2ndly, The extreme profligacy of many of the prisoners, some of whom were so addicted to gaming, that they staked and lost their clothes, and even the articles of

their subsistence. 3dly, The returns included the deaths of prisoners who had been reduced to the last extremity after a sea voyage, during which they laboured under sickness and wounds, particularly those from Spain, towards the end of this year, after the siege of St. Sebastian's and the battles of the Pyrenees. It is evident that these casualties belong to the calamities inseparable from war, and have no relation to the treatment of the resident prisoners. It is equally evident, that the latter owed their extraordinary degree of health to the clean and airy habitations, the wholesome and abundant food, the comfortable clothing, and good medical treatment with which they were supplied by the British government : and it is a matter of public expediency and of justice to the national character, that these facts thus authenticated, should be proclaimed to the world as an answer to the calumnies that have been propagated on this subject—as an appeal to the candour of the enemy—and as a claim on his humanity and gratitude in the event of future wars. This claim, is farther enhanced by the remission in the late treaty of peace, of a large balance due by the French government, amounting to seven million pounds, for the maintenance of their prisoners.

Since the former edition of this work was published the following account of the number at Norman Cross during eight years of the war, viz. from 1806 to 1813, both inclusive, kept with the utmost fidelity, correctness, and humanity, by Mr. Walker, the principal medical officer, has been transmitted to the Author, from which the following general results are deduced. 1. That the average number of prisoners in custody during that period was 5,820. 2. That the annual proportion of deaths in that time was that of 1 in 98. 3. That the average proportion of men in the hospital to that of the whole prisoners was that of 1 in 121. 4. That the proportion of deaths to the number of sick was that of 1 in 15.12.

It appears by returns from Dartmoor, another depôt of prisoners of war, that of 7,500 there were 74 sick. Their ration consisted of $1\frac{1}{2}$ pound of bread, half a pound of beef, half a pound of cabbage, besides soap and beer.

Of 6,100 prisoners on board of ships in Hamoaze, it appeared by an account taken 20th August, 1812, that there were 61 sick. Those who were employed in labour received sixpence per day.

By an account taken in August, 1814, sixty-seven thousand had been sent home.

What are we then to think of M. Dupin, who in a work of considerable celebrity, which may be quoted here as an authentic document, for it was drawn up from materials and means furnished to him by the unprecedented indulgence and liberality of the British Government! In it are stated with great ability and precision the whole condition, circumstances, and regulations of the naval and military force of this country. What are we to think, I say, of the man who at the same time published the most bitter and false invectives against that government in the branch of service we have been treating of. And how ill does this become him who had been the partisan and apologist of the merciless tyrant who practised a uniform harshness in the detention and treatment of British prisoners of war, if those can be called so who had been treated as such on the renewal of the war in 1803, being unoffending civilians, detained in violation of the usage of civilized nations! Nor was the like hard heartedness ever more remarkable than in the refusal to listen to any overtures made to him by this country for the exchange of prisoners in the course of the war, contrary to all the long established usages among the belligerent powers of Christendom. The moral indignation excited by such unfounded statements does not proceed merely from the simple contempt and detestation of falsehood, but the abhorrence of that reckless want of feeling which tends to keep up and

influence national antipathies, and to operate against the practice of humanity should the rival nations ever again be unfortunately involved in war.

I have also since the first edition received the following irrefragable testimony in favour of the humane treatment of prisoners of war. It is the production of the same gentleman of high talents as well as honour, before mentioned, and accompanied with such evidence as could not be the result either of fiction or misrepresentation.

Copy of a Letter from Mr. Walker, charged with the care of Prisoners of War at Norman Cross.

H. M. Ship Genoa, Sheerness, July 30, 1823.

Sir,

Having read with much interest the late Dissertation in which you have so successfully refuted that injurious calumny so widely propagated, and but too easily believed upon the Continent, that the prisoners of war in this country were cruelly treated, and in consequence the mortality among them being great, I have taken the liberty of sending you a statement of the number of sick that were admitted into the hospital of the depôt at Norman Cross during the eight years that I had the medical charge of that establishment; as also the number of deaths that took place every month during that period. By it you will observe that the deaths were fewer in proportion to the population than in the most favoured counties of England, and the proportion the prisoners in health bore to those in the hospital is still more remarkable, especially during the last years of the war. I have known the number of sick as low as seven, and it never exceeded 175. The high degree of health cannot be attributed to situation, for that of Norman Cross was far from salubrious, the country being marshy in the extreme, and intermittent fevers very prevalent both

among the inhabitants and prisoners ; and I certainly did not find the opinion of Dr. Wells verified, that where intermittent fevers are endemic Phthisis Pulmonalis is but little known, for the greater number of deaths that took place at Norman Cross was from that hopeless disease. I am not aware however that the inhabitants suffered in an equal degree. Many reasons might be given why the prisoners were more subject to that complaint. Many of them were natives of warmer climates, and perhaps even that great degree of ventilation so conducive to the general health was unfavourable to strumous habits. To cleanliness, free circulation of air in the building, nutritious food, and regularity of life, must their health be attributed. When a second edition of your very valuable work shall be called for (and I have no doubt of that soon being the case) should you be inclined to extend your observations relative to the treatment of prisoners of war, I shall feel most happy to afford you any information in my power on that subject.

I hope you will forgive the liberty an entire stranger has thus taken in addressing you,

believe me with great respect,

Sir,

your most obedient humble Servant,

GEO. WALKER, M. D. Surgeon R. N.

TABLE X.

A Statement of the Number of Prisoners of War in Health, and those admitted into the Hospital at Norman Cross, during the Years 1806, 1807, 1808, 1809, 1810, 1811, 1812, and 1813.

1806.	No. in Custody the 1st of each month.	No. admitted into the hospital in the month.	Deaths.	1808.	No. in Custody the 1st of each month.	No. admitted into the hospital in the month.	Deaths.
January ..	3914	177	8	January ..	5961	84	6
February..	4628	213	21	February .	5961	94	6
March....	4584	123	9	March....	5955	118	4
April	4541	98	12	April	5958	136	3
May	4528	72	10	May	5952	129	6
June.....	4503	67	2	June.....	5945	79	2
July.....	5213	78	8	July.....	5940	65	5
August....	5551	76	10	August....	5929	107	6
September	5542	69	4	September	5919	95	5
October ..	5537	69	8	October ..	5906	127	6
November	5513	81	2	November	6131	77	2
December	5554	109	4	December	6131	66	6
Total....	.....	1232	98	Total....	.....	1177	57
1807.				1809.			
January ..	5597	117	11	January...	6081	85	6
February..	5923	125	6	February..	6096	133	5
March....	5919	225	17	March....	6069	224	9
April	5901	129	6	April	6060	210	3
May.....	5760	131	7	May.....	6050	143	1
June.....	5902	104	4	June.....	6049	101	4
July.....	5897	138	9	July	6044	54	3
August....	5883	146	3	August....	6042	30	5
September	5877	98	3	September	5998	102	4
October ...	5873	46	4	October ..	6144	73	6
November	5861	95	15	November	6113	71	3
December	5669	92	5	December	6106	39	1
Total....	.....	1446	90	Total....	.....	1265	50

1810.	No. in Custody the 1st of each month.	No. admitted into the hospital in the month.	Deaths.	1812.	No. in Custody the 1st of each month.	No. admitted into the hospital in the month.	Deaths.
January ...	6101	65	4	January ..	5786	64	8
February..	6075	65	8	February..	6181	89	4
March....	6027	86	4	March....	6178	70	4
April	6023	94	1	April	6171	78	6
May	6270	86	4	May	6154	84	4
June	6265	100	1	June	6149	40	5
July	6246	89	3	July	6009	43	6
August....	6246	102	4	August....	6196	21	1
September	6229	76	1	September	6197	27	1
October ..	6227	43	2	October ..	6198	27	5
November	6226	47	5	November	6188	50	7
December	6201	67	4	December	6279	39	5
Total....	....	920	41	Total....	....	632	56

1811.				1813.			
January ..	6041	61	3	January...	6167	35	4
February..	6079	91	4	February..	6163	58	4
March....	6233	85	2	March....	6161	109	8
April	5981	71	4	April	6150	54	11
May	5952	53	2	May	6133	45	2
June	5954	32	5	June	6122	45	3
July	5948	40	1	July... ..	6079	51	2
August....	5918	38	4	August....	5872	41	4
September	5915	22	..	September	5870	36	2
October ..	5914	39	2	October ..	5874	25	2
November	5786	42	..	November	5871	40	5
December	5838	55	5	December	6099	43	4
Total....	....	629	32	Total....	....	582	51

Average number of prisoners in custody during 8 years 5920

Average number of deaths to number of prisoners of war, as 1 to 98

Average number of patients in the hospital to prisoners

in health as 1 to 121

Average of deaths to sick as 1 to $16\frac{1}{2}$

VII.—*Page 102.*

While the Author was a commissioner of sick and wounded seamen, ten recovered men were one day sent from Hoxton to be inspected. Upon questioning them it was found that in four of them the insanity had been occasioned by injuries of the head, of whom three had received these injuries while they were in a state of intoxication.

All cases of lunacy which occur in the navy, are sent for cure and custody to an institution for the general reception of maniacs, situated at Hoxton, in the immediate vicinity of London. From thence such cases as are deemed likely to receive benefit from the treatment at Bethlem hospital, are removed thither, and if they do not recover in a year they are sent back, unless they are dangerous, in which case they are retained. Table VIII presents a view of this branch of the service for the last five years of the late war, as extracted from the records of the Transport Office. By adding to the sum of the number recovered during that space of time, the number remaining on the 31st of December 1808, which appears to have been ninety-nine, and dividing the total by the number of deaths, the mortality is found to have been one in 6.8. By documents called for by a Committee of the House of Commons appointed to investigate the state of madhouses throughout the kingdom, it appears that the mortality calculated in like manner for Bethlem hospital, was one in eleven, and for St. Luke's one in sixteen. At the best regulated hospitals, such as the Retreat at York, the mortality is still less. The high rate of mortality at Hoxton is additional presumption in proof of that mismanagement in this institution, which was too apparent from the parliamentary investigation. There were indeed detected in the course of that investigation such scenes of horror in the general treatment of maniacs, as were disgraceful to human nature, and led to such enactments as have greatly ameliorated the condition of this unfortunate class of beings.

On comparing the number of lunatics entertained at

Hoxton, as stated in the Table, with the number of seamen and marines in Tables I. and II., and supposing the whole maniacs of the navy to be assembled there and at Bethlem, it appears that the number remaining being 140, and the number of seamen and marines voted being 140,000, there is about one in a thousand in that unfortunate situation; and considering the great length of the war, this may be considered as the whole number belonging to this portion of the community. There are no doubt some maniacs belonging to the ships of war on foreign stations, but their number must be inconsiderable, for they are as soon as possible sent home as invalids, and lodged at Hoxton. It appears from all the statements regarding maniacs in general, that there are little hopes of cure, unless it is effected in the first year after the first seizure. It has been judged advisable by the author to record these facts as matter of future comparison, also as the means and motives of future improvement.

VIII.—*Pages 32-60.*

The beneficial effects of the ventilation of transports cannot be better evinced than by the following example. In consequence of the very great mortality of convicts on their passage to Botany Bay in hired transports, in which no attention had been paid to counteract the causes of infectious disorders, a large ship named the *Glatton*, about equal in tonnage to a sixty-four gun ship, originally intended for the East India trade, but which had been purchased by government to serve as a ship of war, was, soon after the peace of Amiens, destined to transport the felons. While she was under repair, Lord Chichester, the Secretary of State for the Home Department, sent Count Rumford, Mr. Graham, a police magistrate, and the writer of this, to Chatham, in order to give directions for fitting up that ship, so as to ensure proper ventilation. The means we recommended were the air-tubes already described, passing from the places where the convicts were to sleep, along the side of the ship to

the open air ; a narrow opening amid-ships the whole length of the upper deck, protected by a covering in form of a pent-house a few inches above it, to prevent rain or other things from falling into it, and scuttles in the side to open and shut according to the state of the weather. By the help of these contrivances, together with due attention to cleanliness and diet, and not being over crowded, the voyage was performed without either fever, flux, or scurvy arising, and without any loss of lives, except five male, and two female convicts, from chronic disorders. The convicts consisted of 269 males, and 131 females, besides 31 women and children. She sailed from Portsmouth on the 23d of September 1802, and passed the same port on the 22d of September 1803, in proceeding up Channel to the Downs, having returned by Cape Horn, and having made the voyage of circumnavigation in three hundred and sixty-four days, of which she was only two hundred and seventy-seven at sea, having been at anchor six days at Madeira, fourteen at Rio Janeiro, and sixty-seven at Botany Bay. The longest time which she was at sea on the outward passage was eighty-eight days, having sailed from Rio Janeiro on the 14th of December, and arrived at New South Wales on the 12th of March. She sailed from thence on the 22d of May, and touched at no port till she arrived in England ; so that she was seventeen weeks and five days at sea. The complement of men with which she sailed from England, was one hundred and seventy, not one of whom died in the whole voyage. Let this detail serve as a record of the perfection to which navigation as well as preventive medicine had attained in the beginning of the nineteenth century.*

* In a correspondence on this subject in 1819 with Lord Sidmouth, then Secretary for the Home Department, his Lordship informed me that great benefit had arisen from the arrangements above-mentioned, and that they had been so much improved upon, that the mortality at sea had been reduced to 1 in 200 in the convicts transported to Botany Bay.

IX.—*Page 74.*

The chemical preparations more particularly alluded to here are the composition-metal, as it is called, employed for hanging the rudder, and fastening the sheets of copper to the ship, being adapted for these purposes by its peculiar property of not being corroded by this metal: the preparation of metals adapted by their different degrees of expansibility in different degrees of temperature, to the delicate adjustments of chronometrical mechanism: also the different sorts of glass, which by their respective habitudes to transmitted light, correct the confusion and error produced by refraction in the lenses of telescopes. This is an improvement which Sir Isaac Newton at one time expressed a despair of ever being attained.* And we have seen a similar despair with regard to the cure of scurvy expressed in a passage already † quoted from the Narrative of Anson's Voyage, reputed and believed to have been written by Mr. Robins, one of the ablest mathematicians and best writers of the last century. Mr. Robins, in this work, pronounces scurvy to be an *immedicable* disease. It would perhaps have been thought equally presumptuous if any one had predicted forty years ago that the discovery of a safe, certain, easy, and speedy method of eradicating the small-pox, was beyond the reach of human sagacity, which has however been since realized. Next to vaccination human life is indebted to the citric acid. When we perceive therefore that

* See Newton's Optics, Book i. Part II. Prop. vii. and Vol. IV. page 68 of Horsley's edition of his works. Yet Newton afterwards (as if it had been pre-ordained, that this individual should, in every point of science which he touched upon, maintain his superiority over all the rest of the human species), in a Letter to Mr. Oldenburgh in the year 1672, (Horsley's ed. Vol. IV. page 322) expresses some hopes of this object being attainable, and plainly hints at the principle upon which Dollond, about eighty years afterwards, (see Phil. Trans. for 1752 and 1765) founded his invention of the achromatic telescope.

certain useful and important discoveries and inventions have been made, some of them drawn from the deepest recesses of science, others found lurking under the very surface of nature, which the most profound and enlightened minds could beforehand hardly conceive, or believe to be possible, does it not afford a cheering and consolatory prospect, “amidst the thousand shocks that flesh is heir to,” that there may still be in store for us, in the boundless progression and endless combinations of knowledge, other hidden means of advancing human happiness, of mitigating human misery, and of making accessions to the dominion of man over nature “which have not yet been dreamt of in our philosophy?”* And may not the extended application of the steam-engine to travelling by land, and other purposes, since the first edition of this work in 1822, be deemed a fulfilment of this prediction.

* The Marine Barometer might have been enumerated as another instance of the application of modern science to useful purposes, being an instrument, which, though not directly subservient to health, is occasionally the means of saving life, by giving notice of the approach of danger, and therefore the mention of it is not here altogether out of place. A very recent instance of this occurred in the hurricane of the 9th of August 1814, the most violent that had been known on the Atlantic Ocean for many years. A fleet of merchant ships from the West Indies, under convoy of the Warrior of seventy-four guns, commanded by Captain Rodd, was exposed to its fury. In the course of a few hours, before the gale came on, which it did with sudden violence, the quicksilver fell from 30.7 to 29.3 inches. The intelligent and vigilant commander, knew well how to avail himself of this alarming prognostic, by taking in sails, striking top-masts, securing the guns, and making signal to the ships in company to do the same. His own ship, and many others, were probably saved from foundering by this early precaution; but such was the violence of the storm, that several ships were lost notwithstanding this warning.—It is somewhat to be regretted, that the barometer is not so useful in this respect in certain high latitudes, for Captain Basil Hall, a highly scientific captain of the navy, in a work, entitled *Extracts from a Journal, &c.* Vol. ii. Appendix, p. 14, observes, that in turning Cape Horn in 1802,

POSTSCRIPT.

After this Dissertation was put to press, the Author found in the Journal Office of the House of Commons, and in the records of the Admiralty, certain documents which promised to throw light on the mortality in the navy in former wars. In the end of the year 1762, the House of Commons issued a precept requiring an account of the number of seamen and marines raised and lost in the preceding seven years' war. The return to this was, that one hundred and eighty-four thousand eight hundred and ninety-nine had been raised, and one hundred and thirty-three thousand seven hundred and eight had been lost, besides one thousand five hundred and twelve, who had been killed. The number under the head of *lost* has been considered as the amount of the deaths from disease, and this construction of it has been given out

in latitude 56.12, the barometer did not fall till after the storm had come on, it then fell from 29.30 to 28.84.

After having dilated so long and so widely on the various ills peculiar to a sea life, particularly as regards health, the reader will hardly be prepared to learn, that there is one complaint, and that one of the most afflicting to humanity, from which seamen alone may be said to be exempt. This is the stone and gravel; for it has been found by a most laborious and accurate research, that while the rest of mankind are afflicted with this terrible malady at the rate of one to three or four hundred of those who are received into other hospitals, it is no less curious that there is not more than one in ten thousand and seven hundred among those who are received into the naval hospitals of England. The cause of this in so far as depends on physiological reasoning is mere matter of conjecture; but if the question is to be decided by ascribing it to the circumstances in a life at sea, as it differs widely from a life by land, the presumption is that it must be owing to the great proportion of salt meat in their diet.*

* See this subject treated at length by Mr. Copland Hutchison, in a Dissertation in the Medico-Chirurgical Transactions, 1818 and 1830; and by Dr. Yelloly, in the Phil. Trans. for 1829. Some errors of the latter have been corrected by the former, in an article in the Med. Chir. Transactions for 1830.

to the world ;* but the Author thinking this incredible, consulted the records of the Navy Office, and found that all those men who had been sent to Hospitals and never returned to their ships, all those who had been discharged as unserviceable, also all deserters were included. This gave no information therefore as to the degree of sickness and mortality. But the House of Commons having required an account of the number of *deaths* in the American war, the Navy Board returned an account of the dead and killed only, as in the annexed Table. It appears from this interesting document, that the total deaths in 1779 were five thousand two hundred and seventy seven. The deaths at hospitals that year were one thousand six hundred and fifty-eight,† which leaves only three thousand six hundred and nineteen for the deaths on board of ships. This does not accord with the statements in pages 11 and 16, but as there was not time for all the ships to have returned from foreign service, and as the war was not then at an end, a complete account could not be taken of the deaths ; and hence the qualifying clause in the title of the annexed Table, *as far as the accounts can be made up.*

* The Medical Commissioner of the Transport Board, at the end of last war, in making a statement of its mortality in comparison of former wars, included in the first, but not in the last, all those discharged from hospitals as well as deserters, which gave a most fallacious result. This will be clearly perceived by comparing the *total* loss of men, as stated by Mr. Hutchison in his ingenious paper on the Infrequency of Stone and Gravel among Seamen, as compared with the statement made in the 11th page of this Dissertation, which consisted of those lost by disease only.

† See Table I.

TABLE XI.

Number of Seamen and Marines raised from the 29th of September, 1774, to the 29th of September, 1780, also the number who have died and who have been killed, from the 1st of January, 1776, to the 1st of January, 1781, as far as the Accounts can be made up.

Dates.	Raised.	Dead.	Killed.	Total.
1774	345			
1775	4,735			
1776	21,565	1,679	105	1,784
1777	37,457	3,247	40	3,287
1778	41,847	4,801	254	5,055
1779	41,831	4,726	551	5,277
1780	28,210	4,092	293	4,385
Total	175,990	18,545	1,243	19,788

DISSERTATION II.

On the Naval Service in the West Indies, chiefly regarding the Health of the Seamen, in 1782.

As a supplement and further illustration of the general abstract of the Comparative Health of the Navy, which forms the subject of another article, in order also to render the contrast of former times with the present more palpable, it may not be devoid of interest and utility to enlarge more particularly on a portion of the service in which I had been engaged during four years.

In the course of the year 1780, my first year of service as physician to the fleet on the windward station, I found from my own returns and from examining the records of the hospitals, that the annual loss of lives from disease previous to our arrival, and some time after, had been at the rate of one in seven: nor was this alarming rate of mortality imputable to the prevalence of the peculiar epidemic of the climate, for there were very few cases of yellow fever; and as the principal causes of it were such as seemed to me to be removable by practicable and attainable means, I was anxious to state these circumstances at the source of authority. I found that in a fleet, of which the complement of men was 12,109, the mortality in one

year had amounted to 1,518, besides 350 rendered unserviceable, a number more than equal to the equipment of three ships of the line. When this is duly weighed by a considerate mind, as it affects the most important interests of the state, together with the great difficulty and expense of replacing these valuable subjects by fresh recruits, and when the calamitous sufferings of the individuals themselves are brought home to our feelings, no case could be conceived more calculated to awaken sentiments of patriotism and humanity.

No opportunity occurred of effectually removing these deplorable evils till the autumn of 1781, when I attended Sir George, afterwards Lord Rodney, to England, whither he went in order to procure reinforcements, foreseeing that the windward station in the West Indies would become the great theatre of war. It was then I made such representations as brought about a total change in the state of health of the fleet.

In a memorial to the Board of Admiralty, I stated the causes of disease to consist in :—

1st. The neglect of cleanliness, ventilation, and dryness in the interior economy of ships.

2ndly. The want of the supply of an article, which had been found, by the most unequivocal experience to be infallible in preventing and curing scurvy, one of the most destructive scourges, and the most peculiar to the sea service, of any class of disease. The remedy alluded to is the juice of lemons or limes.

3rdly. The abuse of spirituous liquors, not merely as the most common means of intemperance, but as the habitual beverage of seamen, even when diluted. I recommended the substitution of wine, and, I ought to have added, of strong malt liquor.

4thly. The want of adequate nourishment and comfort for the use of the sick and convalescent on board of their own ships.

5thly. The want of proper bedding and of soap ; so that along with the suitable articles of diet, the means might be afforded of curing men on board of their own ships, the hospitals on that station being at that time too small, ill arranged, and extremely expensive ; the men by going ashore being also exposed to the epidemic and endemic of the climate, and to the most pernicious temptations, from the facility of procuring the means of intoxication.

6thly. The want of a gratuitous supply of medicines, as well as necessaries to the surgeons, in order to enable them to cure as many as possible without sending them to hospitals.

7thly. As Hospitals are, to a certain degree, indispensable at the principal stations, especially for the relief of ships in which contagious diseases prevail, new regulations of them in point of space, separation, ventilation, and cleanliness, were also recommended.

Though all the recommendations here specified

were not at first complied with in their full extent, enough was done to evince their expediency, and led to great future improvements. I had the immediate and high gratification of succeeding in the recommendation of wine, and of being an eye-witness of its almost incredible benefit in the new reinforcement which accompanied the Admiral on his return. The Formidable of 90 guns, the flag-ship, in which I was embarked, was, by way of experiment, supplied with Teneriffe wine of an excellent quality, to the total exclusion of spirits. Molasses and sour krout were also put on board. By virtue of these peculiar advantages, the men of this ship enjoyed a degree of health far superior to any other in the squadron; for of 750 men none died in the Formidable for four months after leaving England, nor were any in that time sent to the hospital, except thirteen, of whom none were affected with any of the diseases belonging to a life at sea, for they were all cases of small-pox, wounds, and ulcers. Nor did any real sickness break out in this ship, till the infection brought on board at Jamaica by the return of men lent to assist in cleansing the Ville de Paris in the months of June and July in that year. After this the whole fleet was supplied with wine.

Though partial supplies of anti-scorbutic fruits were ordered on particular occasions, it was not till the year 1795 that the general supply of lemon

juice was decided on by the Board of Admiralty. This happened a few months after I was appointed a Commissioner of the Board for the care of sick and wounded seamen ; but it is due to Dr. Blair, then Chairman of that Board, to mention, that he had stated the expediency of the measure some months before my appointment. All the other measures regarding medicines, necessaries, and bedding, were soon after duly attended to, except the supply of soap to men in health, which, by an unaccountable blindness in those who have conducted the civil affairs of the navy, has never been carried into effect.*

Some very impressive examples of the speedy and complete cure of scurvy by the citric acids (the scientific term in chemistry for the juice of the fruits of the genus *Citrus* and natural order *Hesperidæi*) occurred on board of the *Invincible* and *Alcide* in the first year of my service, and next year on board of the *Arrogant*, and a still more striking and conclusive proof of this on a large scale occurred in the autumn of 1782, in a fleet of 28 ships of the line, at New York, as specified in my work on the Diseases of Seamen. In these the scurvy and scorbutic habit prevailed to a great degree ; for though orders were given at Jamaica, where they lay for ten weeks previous to sailing for North America, for the purchase of fruit and other vegetables, very little could be procured

* This has been done since the first Edition of this work.

on account of the extraordinary drought of the season. Fortunately, a small prize vessel loaded with limes, lemons, and oranges, was carried into New York, about the time the fleet arrived, and the whole cargo was, by my advice, purchased for their use. In consequence of this and other refreshments served on board, few cases were sent to the hospital; and the men, as soon as they could walk, were sent on shore for a few hours every day for recreation, by which means their health, strength, and spirits, were restored in a few weeks. It was pleasing on this occasion to see a proof of the great economy of expending small sums of money on refreshments, and to see also a removal of those prejudices which stand in the way of whatever is new, however palpable and demonstrable its benefits may be. One would almost believe that the saving of money was to be held more worthy of attention than the saving of lives; the true statement of the case being that by this plan there is a great saving both of lives and money. The expence of replacing those who die, and of supporting hospitals, cannot be stated at less than twenty times what the supply of fruit and other refreshments would cost. Yet we do not read in the history of our maritime wars, except in one instance, that of Admiral Watson's fleet, in 1757, that any effectual means till now were ever taken for a general supply of this antiscorbutic specific. And it is remarkable enough that a physician to

the Mediterranean fleet, either from unaccountable ignorance or arrogance, forgetful not only of the two instances here mentioned, but of the general supply of lemon juice in 1795, actually claimed the merit of its introduction, and a reward for doing so several years afterwards.

I had also the great satisfaction at this time of having my recommendation for the supply of soap complied with, and of perceiving the vast utility of this temporary supply to the great number of men who were cured on board of their own ships.

It occurred to my mind, as a duty incumbent on me as physician to the fleet, soon after my arrival on the station early in 1780, to enlighten the commanding officers, as far as lay in my power, regarding the most effectual means of maintaining the health and vigour of the men, of preventing the invasion of disease, and of doing justice to the sick. I perceived indeed the most anxious and laudable pains taken to husband and preserve from decay all manner of stores, such as ropes, blocks, spars, gunpowder, and arms. But however precious this may be, as the indispensable implements of war, it will not be disputed that human hands are not equally so. Yet, though there was the additional motive of humanity, it does not appear that this branch of duty had been studied with the like degree of anxiety as that which regards the care of the inanimate material of war. It must also be obvious to naval officers,

that it is on the numbers and vigour of the hands, that their own success and reputation must depend in the conflict with the elements, and in the hour of battle. Money has metaphorically been called the sinews of war ; but the most indispensable article for the efficient purposes of war, is the sinews literally, and properly so called, belonging to the living engines by whose energies it is carried on. This oversight is not imputable to the inhumanity of those who conduct the navy in the civil and military departments, but to that error of judgment, by which they conceive, that all that concerns the health of the men lies in the department of the medical officers, and that if they take care to provide professional gentlemen, possessed of due skill, and furnished with an adequate assortment of drugs and instruments, they stand absolved from all further responsibility in what regards the health of the mariners.

I felt it therefore as a matter of imperious duty to explain myself fully on this subject to the commanding officers of the fleet. This I did in a printed tract, which was distributed among the flag officers and captains. In this I endeavoured to set forth how much the health of the men, particularly with regard to the prevention of disease, depended on the good judgment and exertion of officers, who alone could establish and enforce the regulations respecting ventilation, cleanliness, and discipline. This was extremely

well received ;* and it is not for me to say what share it may have had in the great alteration in the conduct of the officers of the navy regarding these duties, and how far it may have contributed to the revolution which has taken place in later times in the whole system of the medical management of the navy. There can indeed be no situation in which there is more room for genuine virtue, praiseworthy conduct and address ;—none to which there attaches more grave and solemn responsibility ;—none on which there is a more imperious claim on the conscientious discharge of duty, than that of a naval officer. The men are cast on his humanity and discerning judgment under various aspects. A ship in the middle of the ocean is a little world within itself, at the arbitrary disposal of an individual. Seamen and marines are subjected by martial law to a more despotic exercise of power than the constitution of the state authorises in civil life, or even in the army. Naval officers can at their single arbitrary discretion, inflict such a summary and severe

* The author has in proof of this, not only the innumerable testimonies of personal regard which he has experienced during the after part of his life from these distinguished persons, but their interposition on his behalf on the conclusion of the war, when they unanimously made application, through the Admiralty, for a reward to him in peace, no half pay being then established for physicians to fleets. In compliance with this His Majesty was pleased to grant him a pension of ten shillings per diem.

punishment as cannot be inflicted in the army without the solemnity of a court martial: Englishmen surrendering from considerations of public expediency what they hold most dear, and that of which they are most jealous, their liberty, becoming thereby the greater objects of grave, decisive and considerate feelings. All seafaring people, especially those employed in war, are exposed to peculiar and unavoidable privations, hardships, and dangers, which ought to be mitigated, as far as is practicable, by those at whose absolute will they place their lives and limbs:—it is in their character to be unthinking and careless of their own welfare and interest, requiring to be tended like children, and, like children, are entitled to a *parental* tenderness from the country they protect and the officers they obey.

In further prosecution of this subject, the Author will lay before the reader a detail of some of the occurrences of the splendid campaign of the year 1782, with some remarks on the importance and influence of the study of health, and an abstract of the total loss of men in the armaments to which he was attached.

Lord Rodney, from that thorough experience and comprehensive knowledge which might be expected in a commander who had borne an active part in three great wars, clearly perceiving that the chief theatre of naval warfare on which

not only the sovereignty of the ocean, but the fate and character of the nation was to be decided, would be the Carribean seas, quitted his station at the commencement of the hurricane season, during which there used to be a suspension of military operations, by a sort of understood armistice as it were, in order to state and explain this, and to solicit adequate succours against the following campaign. This he did without the leave of the Government, trusting that he would be justified by the magnitude of the object and the purity of the motive. He was not only forgiven, but so liberally listened to, that a reinforcement of twelve ships of the line was immediately ordered to be equipped to accompany him on his return; and the sphere of his command was extended to the whole West India Islands, having been confined before to the windward station. On one of the first days of December he had a closet audience of the King on the subject of the ensuing service, who expressed great anxiety regarding the safety of the Islands, intelligence having just then arrived of the surrender of the army under Lord Cornwallis, and that the Comte de Grasse, after a drawn battle at the mouth of the Chesapeake, had sailed to the West Indies, so as to give the enemy a naval superiority in these seas. Upon this Lord Rodney, with his characteristic warmth of patriotism and loyalty, said to His Majesty, that in place of waiting, as

had been arranged, for the intended reinforcement, all the ships of which could not be ready for three weeks, he would leave town next day, and sail with whatever force he might find ready. He accordingly repaired to Portsmouth the following day, accompanied by his secretary and myself.* Here he found only four ships in readiness, with which he sailed, and was to be joined by two more off Plymouth ; but having met with contrary winds in the channel, he was forced into Torbay, where the fleet was wind-bound for three weeks, during which the other ships had completed their repairs, and a squadron of twelve sailed in the middle of January 1782.

Soon after the arrival of this reinforcement the fleet was further augmented by the arrival of five more ships of the line, so that the Admiral found himself in Gros-Islet Bay, St. Lucia, at the head of a line-of-battle of thirty-six ships, the greatest naval force that ever assembled in one spot either before or since on a foreign station. There

* I happened early that morning to learn from the Marquis of Lothian, gold stick in waiting, that the Admiral wished to see me ; upon which I hastened to his house, when he told me of the hasty promise he had made to the King, and that he must be out of Hyde Park Corner with daylight ; that there was a place in the coach for me if I chose. On stepping into the coach, one of the very few who had heard of his hasty departure came up to take leave, to whom he answered, God bless you, I will send you the Comte de Grasse, and drove off.

were four ships of the line besides in the West Indies then cruising or protecting convoys. Those included in the line-of-battle consisted of five of 90 guns, nineteen of 74, one of 70, eleven of 64, manned with 21,608 seamen and marines.

Such was the state of health of the fleet on the 1st of April, according to my official returns, that in some of the ships there was not a man that could not come to his quarters. The most healthy were either those which had been seasoned to the climate, such as the *Ajax*, in which there was not a single sick man, or those which had recently arrived from England, such as the *Formidable*, in which there were only two on the sick list.

His Majesty's forebodings expressed at Lord Rodney's audience proved too true, for on the arrival of the *Comte de Grasse* on this station, his naval superiority was so great, that he had captured the island of St. Christopher, and some late reinforcements from Europe had swelled his force to an unparalleled amount, a fact which justified the Admiral's solicitude in repairing to England for reinforcements, and accounted for his anxious promptitude in returning to his station.

There lay ready for sea at Martinique at this crisis thirty-three ships of the line; one of 106 guns, two of 90, two of 84, two of 80, twenty of 74, one of 70, five of 64, besides one of 80 under repair. They had, according to the best intelligence, 5,400 land troops on board.

On the morning of the 8th of April a signal was made through a chain of frigates stationed between St. Lucia and Martinique, that the enemy's fleet had unmoored, and were proceeding to sea. Upon this the British fleet, at that moment in complete readiness, took up their anchors, and in little more than two hours were all under way, standing towards the enemy with all the sail they could crowd. It was the decided policy of the French commander not, on any account, to hazard a battle, the sole object of the expedition being that of joining a large sea and land force of the Spaniards then waiting at Cape François, in order to proceed against Jamaica with their joint armament, amounting to the overwhelming force of near 50 ships of the line, and 20,000 land troops.* This mighty and deep laid scheme, so hostile to the best interest of the British nation, could no otherwise be disconcerted

* After news arrived of the signing of the preliminaries of peace, the following year, and some courteous intercourse taking place between the two hostile nations, the Marquis de Bouillé, Governor of Martinique, came one day with his staff to dine with our Admiral (Pigot), and amidst the frank conversation which took place after dinner, where I was one of the company, the Marquis told us that something still more formidable awaited us had the war continued, for it had been projected by our allied enemies, that a much greater armament than had ever been known was to have assembled in Courland Bay, Tobago, of such an overwhelming magnitude as would have made a sweeping conquest of all our islands to windward and leeward.

than by the discomfiture of the armament now rising into full view. In proportion to the momentousness of the object was the anxiety of our commander-in-chief to overtake and attack the enemies of his country, and there has seldom, I believe, occurred in the history of rival nations an occasion on which higher interests, or a deeper stake in point of honour, was to be played for, than what presented itself at this moment. We gained so much upon them, that next morning the van and centre of our fleet, including the flagship, had got within cannon shot of the enemy's rear, and a sharp cannonade ensued, which, however proved partial and indecisive, from the falling of the wind, and from a great part of our fleet being becalmed under the high lands of Dominique. In the course of the two next days the enemy, by dint of great efforts, kept far to windward, and would probably have made their escape, had they not been brought down on the 11th, by a movement to save one of their ships which had dropped to leeward, in consequence of being crippled by running foul of another ship in the night. By this casualty we had the inexpressible pleasure at day-break on the 12th, to discover that we were in a situation to weather a large part of the enemy's fleet, which was now reduced to 30 ships, two having been so much damaged by the action of the 9th, that they could not resume their place in the line, and one

having been rendered inefficient by the accident above-mentioned. The line-of-battle was formed in an incredibly short time, the officers of the fleet having acquired the utmost expertness in naval evolutions in the course of the last two years practice on this station. About half an hour before the engagement commenced, at breakfast on board the *Formidable*, the company consisting of the Admiral, Sir Charles Douglas, captain of the fleet, (an officer whose functions nearly correspond with those of an adjutant-general of an army,) Captain Simmons, commander of the ship, Lord Cranstoun, a volunteer post-captain, the Admiral's secretary, and myself; the conversation naturally turned upon the glorious prospect of the day, and Lord Cranstoun, coming from the quarter-deck, where he had been viewing the two fleets, remarked, that if ours should maintain its present relative position, steering the same course, close-hauled on the opposite tack to the enemy, we must necessarily pass through their line in running along, and closing with it in action. It was accordingly practised with the most complete success, the commander-in-chief setting the illustrious example in the ship which bore his own flag; for the signal for close action thrown out at the beginning of the action, and being adhered to in letter and spirit for about an hour and a quarter, under one general blaze of flame and peal of thunder along both lines, the *Formidable* broke

through that of the enemy.* In the act of doing so we passed within pistol shot of the *Glorieux* of 74 guns, which was so roughly handled, that being

* I now for the first time, mention here the following incident :—about ten minutes before passing through the enemy's line, the Admiral, standing at the starboard gangway, perceiving that we were on the point of coming along side of the *Glorieux*, the 3th or 10th ship whose fire we had taken and returned, looking quickly round him, and seeing no other officer on the spot, desired me to go to the lower gun-deck with his orders to *raise their metal*. This technical phrase I should probably not have understood, had I not been enabled to catch its import by the recollection of the following couplet in *Hudibras* :

Thus cannons shoot the higher pitches,
The lower you let down their breeches ;

for if this holds true so must the converse of it ; that is, the muzzles must be lowered by the elevation of the breeches, and the Admiral's meaning could be no other than that of taking the enemy between wind and water. When I returned upon deck we were in the act of passing the *Glorieux*, as stated in the text. I wish it to be understood, that my motive in this narrative is not merely an emotion of vain glory, and an effusion of levity, which would be ill placed on so grave an occasion, but that I wish to cite it as an evidence in refutation of the Admiral's calumniators, who alleged that he had exposed himself as little as possible, being chiefly in the after-cabin under the poop ; a situation by the bye of greater danger than on the quarter-deck, being exposed to splinters, by which more men are killed and wounded than by the balls ; whereas, the quarter-deck being screened by a barricade of hammocks, is less exposed to danger in every direction, except the musketry from the enemy's tops.

shorn of all her masts, bowsprit, and ensign-staff, but with the white flag nailed to the stump of one of the masts,* breathing defiance as it were in her last moments, became a motionless hulk, presenting a spectacle which struck our Admiral's fancy as not unlike the remains of a fallen hero; for, being an indefatigable reader of Homer, he exclaimed, that now was to be the contest for the body of Patroclus. But the contest was already at an end; for the enemy's fleet being separated fell into confusion, a total rout ensued, and victory was no longer doubtful.

The remainder of the day was spent in desultory actions of single ships, as must naturally happen in a chace. It was late in the day when the *Ville de Paris* struck her colours. The ships immediately engaged with her at that moment were the *Barfleur*, the flag ship of Sir Samuel

* This was no doubt the act of the French officers; for though we had proofs of the inferiority of their seamen to ours in point of bravery, the same cannot be said of their commanders, who are as highminded men as any in the world. We found among the prisoners many persons of distinguished birth. The *Glorieux* was commanded by Viscomte D'Escars, of the House of Fitz-James, as remarkable for his intrepid courage, as for his rooted hatred to the English name and nation. On boarding her our officers found that he had been killed in the battle, and they were shewn the stains of blood on the gunnel where his body was thrown over-board. There were among the captive officers two of the celebrated family of St. Simon, the Viscomte de Betisy, and others.

Hood, the second in command, and the Russell commanded by captain Saumarez. The Formidable was right astern, and having come within shot was yawing, in order to give the enemy a raking broadside, when Sir Charles Douglas and I, standing together on the quarter-deck, the position of our ship thereby opened a view of the enemy's stern, between the foresail and jib-boom, through which we saw the French flag hauled down; upon which we, forgetful of what was due to decorum in that place, stupified as it were by an ecstasy of joy, rushed into each others arms in a hearty embrace.

Now was the point of time, had the exultation of victory permitted, to have reflected with what wisdom, foresight, good judgment, gallantry, and zeal, this campaign had been planned and executed from the time that Lord Rodney left his station in September the year before, to the present crisis. It was by virtue of the seasonable and powerful reinforcements he brought from England, that a naval force, the largest that has ever before or since been assembled on a foreign station, was brought into operation on this momentous day, and by the masterly handling of which the spirit of the nation was revived, its honour retrieved, and the war brought to an auspicious and consolatory termination, after a series of humiliations by sea and land, and the mutilation of the Empire by the loss of its colonies. And whatever faults may have been imputed to the minister at the head of the Naval Depart-

ment,* through the virulence of party and faction, peculiarly prevalent at that period of British history, the highest praise was due to him for the general efficiency of the navy, which was maintained during that war, and for that main point of the administration of it, the judicious distribution of the force, as eminently exemplified at this time.

But to return from this digression. It is natural at first sight to impute this success to the numerical superiority of six ships; but it was computed by Sir Charles Douglas (the most enlightened and scientific naval officer with whom I was ever acquainted,) that the sum total of the weight of the broadside of the French fleet exceeded that of the British fleet by 4396 pounds: and though the number of our guns exceeded that of theirs by 156, their lower-deck batteries, in ships of 74 guns and upwards, consist of 36 pounders, which, according to the difference of the pound of the two nations, are equal to our 42 pounders, and gave the enemy the above-mentioned preponderance of metal on the whole amount. The difference in the number of men was still more considerable; for besides that the French have a much greater complement of men to the same tonnage, they had the assistance of a large body of land forces.

The only cause therefore that can be assigned for British superiority in this and many other naval encounters, can be no other than the close-

* The Earl of Sandwich.

ness of the action, an advantage, however, which being mutual and equal, can be available only to that party which possesses the moral pre-eminence of undaunted courage, and the consequent physical superiority of a better sustained fire; and this was never more fully exemplified and proved than in the present instance. In breaking the line, the Formidable passed so near the *Glorieux* that I* could see the cannoneers throwing away their sponges and hand-spikes, in order to save themselves by running below, while our guns were served with unflinching animation. Another

* Having but little knowledge, and no practice in surgery, and as there was the full complement of medical officers on board, I requested the Admiral's leave to absent myself from the quarters assigned me, and to remain with him on the quarter-deck during the action. It occurred to me also, that I might possibly be of some use in this spot in case of any severe injury threatening life from effusion of blood, and for this purpose I carried some tourniquets about me of a simple construction; but no such accident occurred on the quarter-deck of the *Formidable*. Captain Bayne, of the *Alfred*, killed in the action of the 9th of April, expired by a profuse loss of blood from the leg, which took place while he was carried to the cockpit, so that the timely application of a tourniquet might have saved the valuable life of that excellent officer. The tourniquets alluded to, consisted merely of a piece of leather, somewhat stiff but flexible, about the breadth of the hand, and long enough to embrace the limb, with slits to admit a piece of broad tape; a piece of linen or calico rolled, so as to act as a compress to the artery, and a cylindrical piece of wood to twist the tape in the act of applying the instrument. Would it not be advisable at all times that some intelligent person, a warrant or petty

advantage of close fight is, that more of the shot tell in this situation, though they are much less destructive both to ships and men, unless, according to the recommendation of Robins, in his work on Gunnery, a smaller charge of powder should be used in close action. Distant shot, in consequence of their momentum being spent, make large chasms in a ship's side, shivering whole planks, and causing innumerable splinters, more destructive to men than the ball itself; whereas a near shot cuts so clean, that it makes an orifice even less than its own diameter, and without producing splinters. The average proportion of wounded to killed is about three to one; but this ratio will vary, according to the distance and the charge of powder.*

officer, quartered on the quarter-deck, should carry in his pocket some such instrument, particularly in large ships, on account of the distance of the cock-pit? He need not be a medical officer; and the only instruction necessary would be to point out to him the situation of the great artery in the thigh and arm: or with this information alone, the blood might be stopped by a handkerchief tied tight.

* There has been no opportunity for instituting a comparison on these elements for a good many years, till it occurred at the battle of Navarino, 20th Oct. 1827. The following is the statement of the killed and wounded of the three allied powers, taken from the London Gazette, pages 2325 and 2529; among the British, 75 killed, 197 wounded; among the French, 43 killed, 142 wounded; among the Russians, 59 killed, 139 wounded;—that is, the proportion on the British side of the killed to wounded was that of 1 to 2.6; on the French side that of 1 to 3.3; and on the Russian side that of 1 to 2.3. The

As this part of the narrative appears at first sight to bear little or no relation to the subject of health and disease, does not the author run the risk of laying himself open to the censure incurred by that law of sound criticism, which decrees it to be a violation of unity and good taste, thus to bring together subjects of an incongruous nature; for what two things can be so incongruous, nay (it is to be hoped,) so opposite in their nature and scope, as war and physic? And does he not also expose himself to the charge of vain glory; for what motive, it may be said, could he have, but that of ostentation, for obtruding matters in this place which it was so much out of character for him to touch upon?—Be it so.—He would be guilty of gross affectation were he to deny, that though it would perhaps better become him, at this stage of his existence, and bending, as he now is, under the weight of years and affliction, to subdue and repress as hitherto all such light-mindedness; he does never-

difference in favour of the British as compared to the French is considerable enough to deserve notice, both absolutely and comparatively. In relation to the Russian, the comparative view is so small as not to deserve notice, but the absolute difference is very greatly in favour of the British. If these statements were to be admitted as tests of comparative prowess, it would perhaps be invidious to found it on the British and French relative numbers of killed and wounded; but upon the whole, the most fair comparison, and the most favourable to the British, would be the absolute number killed, viz. 75 British, 43 French, and 59 Russians.

theless feel some degree of pride and satisfaction in looking back on that early part of his life, in which it was his lot to witness, and to act a humble part, in scenes of high moment and interest to the welfare of the state, and the character of the British arms. But he hopes to shew his reader, that there is perhaps more connection than he is immediately aware of, between those actual incidents of war which have been described, and the duties of medical officers: for, besides what has just been stated regarding the different effect of close and distant action on the number and nature of wounds, there are other particulars in which the casualties of battle are connected with the state of sickness and wounds.

1st. A great share of the extraordinary degree of health exhibited in the Table for the month of April, 1782, seems clearly imputable to the influence of success on the spirits of the men. It is related, that when the fleet under Admiral Matthews, in the year 1744, was off Toulon, in the daily expectation of engaging the combined fleets of France and Spain, there was a general suspension of the progress of sickness, particularly of the scurvy, from the influence of that generous flow of spirits with which the prospect of battle inspires British seamen. But if the mere prospect and ardent expectation of battle, without any happy result, could have such a sensible effect, what must be the effect of the elevation of mind created by the exultation of

VICTORY, a victory in which the naval glory of our country was revived and retrieved, after a series of misfortunes and disgraces, which had well nigh extinguished the national pride and spirit in every department of service. The plain and honest, though unthinking seaman, is not less affected by this, than the more enlightened lover of his country. Even the invalids at the hospital manifested their joy by hoisting shreds of coloured cloth on their crutches.* This is the place, therefore, to remark of what importance it is in point of health, to support the spirits of men, depression of mind not only damping their courage, but being favourable to the invasion of disease in every form. There is, perhaps, no disease which low spirits are so apt to produce as the sea scurvy. It is important, therefore, to encourage such innocent and salutary recreations, as music and dancing. It is a common, and I believe, a true remark, that the French have a great advantage over us in this respect, being by nature gifted with constitutional gaiety. But even

* Sir James Macgregor, Director General of the Medical Board of the Army, in his interesting work entitled *Medical Sketches*, adduces a like example of the happy effect of an exalted state of mind in sustaining hardship and fatigue in the army of India, while crossing the Desert in their route to Egypt in the year 1801. I have mentioned a like fact in the account of my mission to Walcheren in the year 1809, which will form an article in this volume.

in them, this may be so far subdued by the depressing circumstances of captivity, as to create scurvy without the ordinary exciting causes of that disease, as was remarkable at Porchester Castle and Norman Cross, where the scurvy appeared among the prisoners, although under the use of fresh diet. It is further observable, that this nation bears adversity with more equanimity than the English. An eminent example of this occurred to my own observation in the case of the Comte de Grasse, commander-in-chief of the French fleet, who was taken in the Ville de Paris. When he was conveyed on board of the Formidable the morning after the battle, the first conversation was carried on with Lord Rodney, through Sir Charles Douglas ; for our Admiral had never learned to speak French. But Sir Charles being much engaged in the duties of the fleet, beckoned to me to replace him as interpreter, introducing me to the Comte in the following facetious manner : *Permettez moi, mon Général, de vous présenter notre médecin en chef, qui est presque assez habile pour faire revivre les morts ;* to which the Comte, humouring the *plaisanterie*, answered, *Et peut-être pour faire mourir les vivans.* It fell to my lot chiefly to entertain him during the rest of the day, and his conversation partook of the like affability and good humour.

2dly. Another circumstance in which the de-

tail of warlike operations affects the duties of the medical officers remains still to be mentioned. In some of the actions in the previous part of the war, a great proportion of the killed and wounded had their injuries inflicted by the accidental explosion of gunpowder, from cartridges catching fire, but still more from the powder used for priming, which, according to the custom then in use, was contained in large ox-horns. In one of the battles to windward of Martinique in the year 1780, out of 167 wounded, 46 were scorches from gunpowder, of which 14 proved fatal. The number of such casualties was greatly diminished in the late actions, in consequence chiefly of greater habits of caution acquired in the course of the war. This applied to the fleet in general ; but these mischances were still better guarded against in the *Formidable* and *Duke*, both of 90 guns, by the use of small priming boxes of tin, as part of the apparatus belonging to locks, and no small additional recommendation to that method of firing guns. The service is indebted for this great improvement to Sir Charles Douglas, who first introduced it into the navy when he was captain of the *Duke*. The whole, or the greater number of the guns of this ship were furnished with locks, but only a few in the *Formidable*, and none in any of the other ships. Part of this method consisted in filling the touch-hole with

powder contained in a quill,* which made no more priming powder necessary than what was contained in the small tin box. The eminent and ingenious contriver of this improvement suggested, that it was incumbent on me, as a point of professional duty, to represent these facts to the Board of Ordnance, as the means of saving men from dangerous and fatal injuries. This I accordingly did; and this consideration, in addition to the more obvious advantages in the quickness of firing, and the greater accuracy of direction, may have probably had some share in deciding the adoption of an improvement which has since become universal in the navy.†

Lastly. The only other remark to be made on this subject is, that it has been ascertained by long experience that no refreshment but plain water, ought to be allowed to the men during action;

* Though it is now forty-eight years ago, the anxiety of Sir Charles Douglas in providing a sufficient number of these quills preparatory to the battle, is still fresh in the author's memory, and he distinctly recollects, that 60 of them were expended this morning at the gun to which he was attached.

† Major General Sir Howard Douglas, the son of Sir Charles, seems to inherit a mind congenial to that of his father, being author of a most profound, scientific, and elaborate work, entitled, a Treatise on Naval Gunnery; also the inventor of a new mathematical instrument, said to be of great utility in certain practical operations.

and the expediency of it has been established by the immemorial usage and uniform practice of the British navy. It has been equally ascertained by experience, that in all violent and even protracted bodily exertions, whether from necessity or for wagers, as in long walks, it is found that strongly nutritious food and stimulant liquors, taken either immediately before, or during such trials of vigour, do not sustain but impair the animal powers. This is particularly applicable to men in the heat of action. It would appear that there is something in situations of exertion and danger which infuses a sort of preternatural vigour far surpassing the effect of any corporeal stimulus. When the mind is interested and agitated by warm and generous affections, the body forgets its wants and feelings, and is capable of a degree of labour and exertion which it could not undergo in cold blood. The quantity of muscular action expended in fighting at a great gun for a single hour, is perhaps greater than what is employed for a whole day in ordinary labour; and though performed in the midst of heat and smoke, and with little bodily refreshment, yet the powers of nature are not exhausted or overstrained; even the smart of wounds is not felt. Though pure cold water was the only refreshment allowed in time of action in the West Indies, it may be advisable in cold climates and seasons, to add a very small portion of spirits, the very idea of

which would give the men more confidence in the efficacy of their beverage. Those who walk for wagers are said to indulge in a tea-spoonful of brandy in the small draughts of water which they take from time to time. On this subject it is an instructive remark, well ascertained by experience, that after excessive fatigue, the strength is best and most safely recruited by a slender meal. I have known dangerous fevers brought on by full meals of animal food and fermented liquors in such circumstances. The only circumstances in which artificial cordials are admissible in such cases, are when the body labours under debility, or languor, constitutional or morbid, or where there is eminent danger from profuse hæmorrhage from a wound, in which case it is advisable to administer freely pure spirits, or tincture of opium, in order to prevent the immediate extinction of life.*

After my return to England in the year 1783, I was enabled, from my own notes, and from information derived from the official records at the Navy Office, and at the office of Sick and Wounded Seamen, to make out a statement of the whole loss of lives in the fleet in which I served as physician, from the beginning of 1780 till April 1783, a space of three years and three months.

* See this subject more fully treated, in my *Diseases of Seamen*, and in a work entitled *Elements of Medical Logic*.

It came out as follows :

Died of disease	-	-	-	3200
Killed in battle	-	-	-	640
Died of wounds	-	-	-	500
Total				4340

It is a very general and true remark, that in war more perish by disease than by the sword : in the present case the proportion is about three to one. We find the same remark made by ancient historians. Arrian, in his Narrative of the Expedition of Alexander the Great into India, makes the following remark : *Οἱ δὲ ξυμπονῶντές τε ἔτι καὶ ξυγκινδυνεύοντες, αὐτοί τε καὶ ἡ Μακεδονικὴ στρατιὰ, τοὺς μὲν ἐν ταῖς μάχαις ἀπολωλέκασιν, οἱ δὲ ἐκ τῶν τραυμάτων ἀπόμαχοι γενημένοι, οἱ πλείους δὲ νόσῳ ἀπολώλασιν.* Arrian, Hist. Alexand. Expedit. l. v. c. 26.*

Those who were lost at sea in ships of war in the hurricane of 1780, and in the great Atlantic storms in 1780 and 1782, in the former the Thunderer and two frigates, and in the latter the Ville de Paris, Glorieux, and Hector, captured ships of the line, besides the Ramillies and Centaur, each of 74 guns, were lost, are not included in this

* The only exception to that I ever knew or read of, is what occurred in Egypt. Sir John Moore, who commanded one of the brigades, in answer to some inquiries of mine regarding the climate of that country, informed me under his own hand, that the number of killed, though not greater than what was usual in other campaigns, was greater than that by sickness, including even the plague, of which some of the soldiers died.

statement. The number of men who perished at these disastrous periods amounted to near four thousand.

It has appeared, from what has been stated in the preceding article of this volume, how greatly the health of the navy has improved since the period which is the subject of this article. While I was a medical commissioner of the navy, I compared the numbers admitted into Haslar and Plymouth hospitals during the five years of war with France in the American contest, with the first five years of the late revolutionary war. I found, that in the former the number admitted exceeded that in the latter by 27,000, though a greater naval force was kept up, and a greater proportion of it on home service, than in the like period in the preceding war; and in 1811, a still more advanced period of the late war, I was informed by Dr. Baird, inspector of naval hospitals, that on comparing the five years then elapsed with the first five years of the war which began in 1793, he found that the amount of sickness and mortality of the latter was four times that of the former. See Tables in the preceding Appendix.

The assignable causes of these mighty improvements, which, while they are so highly conducive to the vital interests of the nation, may be considered as proud triumphs achieved in the cause humanity, have been—

1st. The manning of the navy at the com-

mencement of the late war with less impressing, and with circumstances less conducive to the engendering and diffusing of infection, than in former wars.

2ndly. The better observance of cleanliness, ventilation, dryness, and sobriety, in consequence of the general conviction of officers, of the necessity of these to the preservation of health; and that the due attention to them made an essential and indispensable part of their duty, even more than of medical officers, since they had it more in their power to enforce those salutary practices, on which prevention depends.

3dly. The general supply of lemon juice, so judiciously and liberally allowed to ships of war since the year 1795. By this the scurvy has been so entirely eradicated, or rather prevented, that there are now surgeons of the navy of long standing, who have never seen a case of it; and it has been already mentioned, that in less than eighteen months after the general supply of it, Lord Spencer did not find a single case of it in Haslar hospital.

4thly. The regulations established by the Medical Board of the Navy, in the last years of the last century, already alluded to.

Lastly. The superior encouragement given to medical officers, which has had the effect of procuring a better educated class of men, though still inferior to those of the army from want of equal encouragement.

In order to render the advantage of the study of health in the present times, as compared with former ages, more palpable, I shall extract from history a few instances of those expeditions by sea, which have either been totally frustrated, or nearly so, by the neglect or ignorance of the means of preserving health.

The life at sea being more artificial than that at land, affords greater latitude for good and bad management in the conduct of health. The losses and miscarriages of expeditions on this element, have by the records of history been both more numerous and more grievous than those by land. There is one disease, the scurvy, which has affected armies so rarely, and in so small a degree, that it may be reckoned peculiar to the sea service, of which it used to be the greatest scourge. Sir Richard Hawkins, an eminent commander and navigator, in the reign of Queen Elizabeth, mentions that in the course of twenty years, he had known of ten thousand men having perished by this disease; a prodigious number, when we reflect that the navy then was not more than a twentieth part of what it now is. The expedition to the West Indies and North America, in the year 1693, consisting of two ships of the line and six frigates, under Sir Francis Wheeler, miscarried in the attack on Martinique, through the force being weakened by diseases; and in his voyage to England, the companies of his ships were so weakened by mortality from scurvy and

fever, that there were hardly hands enough to bring the ships to anchor on their arrival there. But perhaps the most disastrous instance of the baneful effects of sickness in the public service, is in the expedition of Admiral Hosier, consisting of seven ships of the line, to the West Indies, to protect the trade in the year 1726. He buried his ships companies twice over, and in place of quelling and coercing the Spaniards, he was set at defiance and insulted by them, and died of a broken heart.* The expedition to the same quarter under Admiral Vernon, in 1740, was hardly less calamitous. The sufferings and dangers of Commodore Anson's crew, as well as those of the Portuguese, have been already adverted to.

Since the middle of the last century, no expedition by sea can be said to have miscarried from the prevalence of disease alone: but in the course of the seven years war and the American war, six general engagements took place in the East Indies, every one of which were *drawn battles*. Is it not presumable that some of these might have proved *victories*, had it not been for the deficiency of hands in consequence of mortality and disease? The great difficulty, and even impossibility of replacing men on remote service, forms an additional motive for the study of health in distant and unhealthy climates. Lascars and Chinese were indeed from necessity, employed in ships of

* See Charnock's *Biographia Navalis*.

war in the East Indies, to supply the great loss of seamen; but these feeble Asiaticks were found to be miserable substitutes for British seamen, whether for going aloft or at the guns. The late revolutionary war may be said to form a contrast with all preceding wars in point of health, and to this its unexampled glories are in no small degree indebted. And it is to be hoped that the methods of securing this invaluable blessing are now so rooted in the practical habits, experience, and convictions of naval officers of all descriptions, that those scenes of misery and disaster which have been quoted from history, and which rend the heart in the narration, can never recur, should the nation ever again be involved in war, which in the common course of human affairs, can hardly be doubted.

TABLE I.

[To face page 146.]

Shewing the Number of each Disease on board on the First of each Month, the Numbers sent to the Hospital, and who died, in the course of the Month.

SHIPS' NAMES. N. B. those marked *, arrived with Lord Hood.	FEBRUARY, 1781.									MARCH.									APRIL.									MAY.									JUNE.										
	Fever.			Flux.			Scurvy.			Fever.			Flux.			Scurvy.			Fever.			Flux.			Scurvy.			Fever.			Flux.			Scurvy.			Fever.			Flux.			Scurvy.				
	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.	On board.	Sent to the Hospital.	Died.					
Sandwich - -	8	0	0	4	0	0	2	0	0	8	3	1	4	0	0	2	2	0	6	0	2	9	1	1	2	4	0	2	2	1	10	5	0	5	18	0	2	0	0	3	0	0	10	0	1		
* Barfleur - -	8	0	1	4	0	1	3	0	0	28	4	0	35	0	0	5	27	2	24	0	0	25	0	0	33	0	0	12	3	1	16	1	0	54	10	0	20	0	0	13	0	0	58	0	0		
* Gibraltar - -	25	0	2	4	0	0	4	0	0	8	1	0	0	0	0	6	22	0	0	0	1	0	0	0	18	0	0	4	0	0	0	0	0	30	22	4	3	1	0	4	0	0	48	17	0		
Triumph - -	0	0	1	1	0	1	21	8	0	3	0	0	2	0	1	24	18	1	0	0	1	3	0	2	12	0	2	0	1	1	0	0	0	13	8	1	1	0	0	0	0	0	6	5	0		
Centaur - -	2	0	0	2	0	0	20	0	8	7	0	0	4	0	0	50	0	8	2	0	0	3	1	0	55	1	1	0	0	0	2	0	2	15	4	0	4	0	0	9	0	1	15	0	0		
Torbay - -	6	0	0	11	0	0	1	0	0	7	0	0	8	0	0	8	0	0	6	0	0	8	0	0	23	27	2	6	0	0	13	7	0	44	31	0	16	0	0	6	0	0	9	0	1		
Monarch - -	13	0	3	13	0	0	2	0	0	5	0	0	4	0	0	1	0	0	8	0	4	17	0	0	0	0	0	5	2	2	3	0	0	57	11	0	4	3	1	4	0	0	36	5	0		
Terrible - -	2	0	0	10	0	0	1	0	0	2	0	0	9	0	2	3	0	0	0	0	0	10	0	0	4	3	1	0	0	1	10	4	0	5	20	0	3	1	0	12	0	0	20	1	0		
Montagu - -	40	0	8	14	0	5	4	0	0	§	§	5	§	§	3	§	§	1	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	
Alfred - -	4	0	0	4	0	0	4	0	1	25	0	0	8	0	1	56	16	2	11	0	0	26	0	1	116	44	4	15	10	1	11	3	0	130	25	2	14	§	§	10	0	0	26	0	0		
Russel - -	0	0	0	7	0	2	2	1	0	7	0	0	8	2	0	0	61	5	0	0	0	4	0	1	44	0	3	0	1	0	8	0	0	132	102	4	0	1	0	19	1	0	14	1	0		
Alcide - -	1	0	1	9	0	0	1	0	0	1	0	0	1	0	0	15	0	0	1	0	0	3	0	0	8	16	0	0	0	1	1	0	0	40	35	0	4	2	0	5	0	0	26	5	0		
* Invincible -	0	0	0	0	0	0	0	0	0	6	1	0	1	0	0	5	6	0	4	0	0	4	0	0	2	0	1	7	0	1	6	8	4	31	54	4	8	0	0	22	0	0	10	1	0		
Resolution - -	1	0	0	7	0	1	0	0	0	6	0	0	5	0	0	1	0	0	5	0	0	8	0	2	7	0	1	5	2	0	9	0	0	15	45	2	1	0	0	3	12	0	84	0	2		
Shrewsbury -	8	0	0	0	1	1	6	7	0	5	0	1	6	0	0	0	0	0	4	3	0	0	0	0	4	6	0	3	1	0	5	2	0	22	6	2	3	§	§	4	§	§	20	§	§		
Ajax - -	8	0	1	6	0	5	3	0	1	2	0	2	10	0	5	6	0	6	4	0	1	15	4	2	30	5	10	4	1	1	3	0	0	8	0	1	2	0	0	2	0	1	6	0	0		
* Princessa - -	8	0	1	3	0	1	0	0	0	6	0	5	2	0	0	4	102	2	6	0	0	1	0	0	40	0	1	2	0	0	2	0	1	30	40	2	2	0	0	6	40	0	70	154	0		
Intrepid - -	18	1	1	10	4	0	1	0	0	10	0	0	9	0	0	0	0	0	9	§	§	13	§	§	1	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§
* Belliqueux -	11	0	0	10	0	5	0	0	0	3	1	2	52	0	1	0	1	0	0	0	0	3	0	0	2	0	0	0	0	0	2	0	0	2	0	0	2	0	1	3	0	0	8	0	0		
* Prince William	21	0	0	17	0	0	4	0	0	23	12	0	47	62	5	6	10	0	19	2	0	147	40	0	16	7	0	5	5	2	53	5	0	7	4	0	4	4	2	13	3	1	8	7	0		
* Panther - -	2	0	0	4	0	0	0	0	0	5	0	0	8	0	0	4	0	0	2	0	0	4	3	0	9	1	0	3	2	0	8	4	0	1	0	0	3	0	0	8	1	0	1	1	0		
Triton - -	7	0	0	15	2	0	14	0	0	3	2	0	12	2	0	6	0	0	2	0	0	2	0	0	0	0	0	3	0	0	4	0	0	0	1	0	2	0	1	1	0	0	1	0			
Hyena - -	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	1	2	0	0	5	0	0		
Cyclops - -	4	1	0	3	0	0	0	1	0	4	0	0	3	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total - -	197	2	19	158	7	22	93	19	10	174	24	16	238	67	18	202	265	27	115	5	9	307	49	9	428	114	26	76	30	12	166	39	7	641	436	22	101	12	6	149	57	5	480	198	4		

Where the Spaces are marked thus §, no Return was made.

TABLE II.

*Abstract of the Returns for April, 1782.**[To face page 146.]*

SHIPS' NAMES.	FEVER.				FLUX.				SCURVY.				WOUNDS.			
	Sick on board on the 1st of the Month.	Put on the List during the Month.	Died.	Sent to the Hospital.	On board on the first.	Put on the List.	Died.	Sent to the Hospital.	On Board on the first.	Put on the List.	Died.	Sent to the Hospital.	On board on the first.	Put on the List.	Died.	Sent to the Hospital.
* Formidable -	0	6	0	1	2	7	0	0	0	5	0	0	0	37	0	0
Barfleur -	6	20	0	1	5	13	0	1	6	30	0	1	0	37	8	6
Prince George -	0	12	2	1	4	18	1	0	0	7	0	0	0	24	3	0
* Duke -	57	78	2	32	0	3	0	0	0	1	0	0	0	60	2	0
* Namur -	5	14	0	2	11	9	0	3	8	5	0	2	0	25	0	0
Royal Oak -	1	4	0	0	11	23	0	3	1	1	0	1	0	54	5	15
Alfred -	8	46	1	0	6	14	0	0	15	14	0	2	0	30	0	0
Montagu -	6	11	0	0	8	2	1	5	2	2	0	0	0	25	5	0
* Valiant -	†	10	1	0	†	0	0	0	†	0	0	0	0	37	0	0
Monarch -	5	21	1	0	3	10	0	1	0	1	0	1	0	33	2	1
* Warrior -	0	2	0	0	6	12	0	0	0	0	0	0	0	20	0	0
Centaur -	12	20	0	1	10	15	0	1	5	15	0	0	0	14	0	0
* Magnificent -	0	21	0	0	0	8	0	0	7	16	0	0	0	20	0	0
Bedford -	11	20	0	0	3	27	0	0	1	10	0	0	0	17	4	0
Ajax -	0	0	0	0	0	0	0	0	0	0	0	0	0	30	1	5
Canada -	0	6	1	0	24	70	2	0	2	8	0	0	1	12	0	0
Resolution -	19	25	1	0	21	27	0	0	0	0	0	0	0	19	2	0
* Hercules -	2	38	0	4	5	18	0	0	0	12	0	2	0	18	0	0
Russel -	3	3	0	0	5	4	0	0	0	1	0	0	4	29	3	1
* Fame -	36	50	0	0	3	8	1	0	0	7	2	0	1	12	2	0
Torbay -	10	10	0	0	9	2	0	0	3	2	0	0	0	25	3	0
Princessa -	1	2	0	0	2	8	0	3	0	0	0	0	0	19	2	0
* Conqueror -	30	†	1	11	0	†	0	0	10	†	0	0	0	23	2	0
* Arrogant -	2	16	0	0	6	33	0	0	4	10	0	0	0	11	0	0
* Marlborough -	7	19	2	0	12	21	1	0	0	6	0	0	0	16	1	1
* Yarmourh -	0	3	0	0	4	3	0	0	3	3	0	0	0	33	2	0
Belliqueux -	43	118	0	6	6	4	0	2	0	3	0	0	0	10	0	0
Prince William	4	27	0	0	2	24	0	0	5	18	0	0	1	0	0	0
* Repulse -	20	40	0	0	2	2	0	0	3	2	0	0	0	9	1	0
St Albans -	1	22	0	0	0	6	1	0	0	0	0	0	0	7	1	0
* Agamemnon	2	5	0	0	0	1	0	0	0	0	0	0	0	23	7	0
* Prothée -	6	13	1	0	5	49	0	0	0	0	0	0	0	24	2	0
America -	2	5	0	0	3	14	0	0	2	0	0	0	1	27	2	0
* Anson -	3	6	0	0	0	26	0	0	1	1	0	0	0	13	0	0
* Nonsuch -	6	11	1	0	0	4	0	0	18	25	0	6	0	2	0	0
Alcide -	2	6	0	2	7	16	0	0	7	0	0	0	0	15	0	3
Ramillies -	†	26	1	4	†	6	0	0	†	3	0	3				
Nymph -	2	7	0	0	8	9	0	0	0	0	0	0				
Flora -	0	0	0	0	2	0	0	0	0	0	0	0				
Total -	312	743	15	65	195	516	7	19	103	208	2	18	8	810	60	32
																244

N. B. The Ships marked thus *, came from England in February and March, 1782.

All the Ships named in the Table were in the Engagements in April, except the Ramillies and the two Frigates.

In the Spaces marked thus †, no Return was made.

DISSERTATION III.*

On the COMPARATIVE PREVALENCE and MORTALITY of different DISEASES in LONDON; illustrated by Abstracts of Cases which occurred to the Author at St. Thomas's Hospital, and in his Private Practice, embracing a period of Twenty Years.

THE history of diseases in different ages, as a branch of general knowledge deeply interesting to the human race, would be sufficiently important to command the attention of the intelligent part of mankind, independently of its application to professional purposes. A little reflection, however, will shew that such knowledge is highly conducive, and even indispensable to the cultivation of practical medicine, and the regulation of medical police.

It was a remark which I heard made, and illustrated with his characteristic profoundness and precision, by Professor Adam Ferguson, in his Lectures on Moral Philosophy in the University of Edinburgh, that all observation is suggested

* This Dissertation is taken from the fourth volume of the Medico-Chirurgical Transactions, published in 1813; but many new facts and illustrations were added in its republication in 1822, and still more in the present edition.

by comparison. He might have added, that all practical deductions, whether in common life or in physical science, are grounded upon it, corrected and extended by it. As all practical researches ought to be built on an induction of facts, single objects or events are of little value except in so far as they stand related to others : and when numerous objects and events present themselves in repeated and uniform combination, it is only by varying them and comparing them with others that useful inferences can be drawn from them, and that the relation of cause and effect can be distinguished from casual coincidence or simple succession. Those physical agencies, on the discovery of which all practical knowledge is built, and those analogies in which all suggestions and rational conjectures originate, can only be ascertained by an enlarged view of nature, which, by enabling us both to elicit new truths and to adapt means to ends, may be considered as at once the instrument and the light by which we work, whether in art or science.

It could easily be shewn how much more applicable these remarks are to medicine than to any other art or science, from the peculiar intricacy and complexity of the objects about which it is conversant, and the more numerous* sources

* The like sentiment is happily expressed by Bacon, in the following passage : “ Subjectum istud Medicinæ (corpus nimirum humanum) ex omnibus, quæ Natura procreavit est

of fallacy and error incident to it, no less from the superstition and credulity of rude ages, and of the ignorant and vulgar in all ages, than from those hypothetical and spurious reasonings engendered by false physiology and pathology, through the perverted application of the science of inanimate nature to animal nature in the learned ages.

But as abstract disquisition does not belong to this place, and as I have elsewhere * attempted an outline of this subject, I shall pass to the proper matter of this communication.

Impressed with the high opinion of the advantages derivable to the art of physic from comparative views, I have endeavoured to bring an humble contribution to the medical history of this age and country, by giving some account of one of the largest hospitals in this metropolis, to which I was physician for twelve years; and having kept notes of all the cases that occurred to me during the greater part of that time, and also in my private practice at all times, I propose to submit to the public some of the principal results of the former from 1784 till 1794, and of the latter from 1795 till 1805.

But with a view to comparison, it will be ne-

maximè capax remedii, sed vicissim illud remedium maximè est obnoxium errori. Eadem namque subjecti subtilitas et varietas, ut magnam medendi facultatem præbet, sic magnam etiam aberrandi facultatem." *De Augmentis scientiarum*, liber iv. cap. ii.

* See Elements of Medical Logic. Lond. 1821.

cessary to carry back our researches into former times; and for this purpose I shall endeavour, from such imperfect lights as professional writings, historical records, and the bills of mortality afford, to make a brief recital, 1st. of the most remarkable diseases which have arisen, and have since disappeared in this country in the course of time; 2ndly, of those which have arisen but have not disappeared; and 3rdly, of those which have prevailed with various degrees of frequency and fatality at different periods; concluding 4thly, with an enumeration of those that have been more prevalent in our times than in former ages.

To the first description belong the leprosy and sweating sickness. The leprosy became general all over Europe in the twelfth century, and was supposed to have been imported by the crusaders. It is recorded in all the histories of the times, that in France alone there were two thousand hospitals appropriated to leprosy. It became extinct in England in that age, but was again imported, and again became extinct, so as not to have been known as an epidemic in Europe since the beginning of the sixteenth century.

The sweating sickness has been clearly traced to the army which invaded England under Henry VII. It prevailed from 1485 till 1551, and in some years during one month in autumn, with a fatality approaching to that of plague. This disease appeared so curious, singular, and important, as to have employed the pens of Bacon, Erasmus,

Sir T. More, Dr. Caius, and other eminent philosophers, and physicians. The opinion of the Author will be further disclosed in the Dissertation on Infection, one of the articles of this volume.

To the second description belong small-pox, measles, and perhaps all other specific contagions, and the venereal disease ; and though the exact periods of the origin of each of these cannot be ascertained for want of historical records, there is every reason to believe that there was a time when none of them existed.

To the third description belong the plague, the dysentery, intermittent fevers, typhous fever, the small-pox, the venereal disease, the scurvy, and the rickets. It is doubtful whether the plague ought not to be referred to the former list, for though it resembles the plague of the ancients in point of fatality, its characters are quite different from those described by Thucydides and other authors, so that it was perhaps generated in the middle ages.

The first mention of the plague in the English history is in the year 430 ; the last year in which it was epidemic here was in the year 1665, and the last year in which mention is made of it in the bills of mortality is 1679. With regard to dysentery and intermittent fevers, there is the most incontrovertible evidence from the bills of mortality, from professional and other writings, of the great and rapid decline of these diseases. It appears

from these bills, that the annual deaths from bowel complaints, of which dysentery was the principal, fluctuated from one thousand to two thousand, some years amounting to upwards of four thousand in the seventeenth century; that they fluctuated from one thousand to one hundred in the first part of the eighteenth century, and from one hundred to twenty in the latter half of it. And I find from inspecting those bills for the first ten years of the present century, that the number of annual deaths under this head has been on an average 22.8. The bills of mortality are justly chargeable with great want of discrimination; but the differences are so wide, and the reduction of numbers so regular, that there can be no doubt of this, as a general truth.

With regard to agues the bills do not afford us satisfactory information, the disease being blended with continued fevers till the beginning of the eighteenth century. We learn from Dr. Caius, or Keye, the most eminent physician in England of that age, that the mortality from agues in London in the year 1558 was such, that the living could hardly bury the dead. And Bishop Burnet, in his *History of the Reformation*, speaking of the same year, says, “intermitting fevers were so universal and contagious,* that they raged like a plague.”

* As these are not the words of a professional author, the term “contagious” is no doubt used in a loose sense, intermitting fevers not being contagious; the same abuse of this

In the next century, we learn from Sydenham and Morton, that intermittent fever was one of the most prevalent and fatal disorders in London from 1661 to 1665, and that for some years afterwards this complaint was very rare. This was probably owing to the greater dryness of the streets, effected by draining, when the city was rebuilt after the great fire of 1666. We are told, however, by Sydenham, that these fevers revived before the end of the century, and were epidemic from 1677 to 1685. They prevailed a good deal during the first part of the eighteenth century. The number of deaths reported in the bills in 1728 is forty-four, in 1729 forty-seven, in 1730 sixteen : they then greatly declined ; but we learn from a work of Dr. Fothergill, that they returned in an endemic form in the years 1751, 1753, and 1754. For more than thirty years past from the date of writing this (1813,) according to my own observation, and the best information I can gather from others, this disease has not been known as an endemic in this metropolis. In the first ten years of this century (the nineteenth,) the number of deaths under this head in the bills has not been more than four. I was physician to St. Thomas's

word is met with in other unprofessional authors, but it is highly probable that they were frequently combined with typhus and dysentery, both contagious diseases, as has been remarked in the Dissertation on the Walcheren fever, page 87 of this volume.

Hospital, from the year 1783 till 1795, during ten years of that period the whole number of intermittents that fell under my care was one hundred and ninety-two. As there were three physicians, this may be reckoned the third part of the whole admissions for ten years in an hospital containing four hundred and thirty patients, and admitting at an average about three thousand annually. I have not noted in my journal from what quarter they came; but my memory perfectly warrants me in affirming, that the great majority of them were labourers, chiefly Irish, from marshy districts, particularly Kent and Essex; and there is this internal proof of the greater part being strangers, that, of the number above specified, only thirty-three were females. Had they belonged to the resident population, the number of each sex would have been nearly equal. On referring to the notes, which I keep of my private practice, I find that in the course of twenty-five years, I have met with sixty-three intermittents. Of these, twelve belonged to the armies, that had served in Holland or Zealand, and of the number affected in England, more than one-half came from the aguish counties. Several of the cases of those who belonged to the resident population were so slight and irregular, as to render it doubtful whether they were strictly referable to this *genus* of disease.

The *typhous* fever, the worst cases of which

used to be better known by the ordinary appellation of *putrid* fever, and having for their remote cause the accumulation of filth and want of ventilation in jails, hospitals, ships, the habitations of the poor, and the close buildings of great cities, has probably been in all ages and nations, at least in cold and temperate climates, the most frequent form of continued fever.* But these causes being interwoven with the common habits and occurrences of life, had escaped the observation of medical authors till about the middle of the last century. One of the most striking and undeniable proofs of the contagious nature of typhous fever occurred towards the end of the late war, in the island of Rathlin, on the north of Ireland, where there was a garrison

* It seems to be a general law of animal nature, at least among the mammalia, that the accumulation and stagnation of the exhalations of the living body produce disease. The glanders of horses arise only in large stables, and the distemper of dogs, in kennels. In the expedition to Quiberon in 1795, several transports, crowded with horses, had their hatches shut for a considerable time in a storm, by which some of them were suffocated; and among the surviving horses the contagious disease called glanders was engendered. This is stated on the authority of professor Coleman of the Veterinary College. During the American war, it was proposed to send live sheep from England across the Atlantic. In a few weeks, in consequence of being crowded in a ship, they all died of a febrile disorder. About thirty years ago there was a great mortality among haddocks in the north sea, which for want of any rational or probable cause, was considered by some persons an epidemic or endemic disease.

free from all disease, but they were immediately affected with it on the arrival of a reinforcement from Scotland, among whom it had been prevailing. The facts relating to this subject were first clearly stated by Pringle and Lind. No example more convincing than these can be adduced of the substantial benefit of the lights of knowledge; for the measures which have been successfully taken for the prevention of these diseases and which are peculiar to our own times, have been founded on the knowledge of their remote cause.

The mitigation of the venereal disease has arisen from superior habits of cleanliness, and superior skill in the cure; that of the small-pox from inoculation and vaccination.

With regard to the scurvy, by which I mean, a disease having the characters of the sea-scurvy, a considerable mortality is assigned to it in the London bills of the seventeenth century. From the ambiguity of the term, which is loosely applied also to cutaneous affections, we should be at a loss to know, whether it is the sea-scurvy or not; but in the first place, it is not likely that cutaneous diseases should be liable to so much mortality, and next, we know from the description which Willis has given of it, that a disease having the genuine characters of the sea-scurvy, did prevail in London in that age, though now entirely extinct. The deaths under the head of scurvy in the seventeenth century were seldom under fifty,

frequently as high as ninety, and in the year of the plague they amounted to one hundred and five. They declined rapidly at the end of that century, and may be said to have vanished ever since. The scanty supply* of fresh vegetable food for man, and winter fodder for cattle, which made it necessary to slaughter and salt them for winter use; also the greater uncleanness and dampness of the streets and houses, accounts for the existence of it in those times. It is now nearly as rare at sea as at land in consequence of the improved diet, cleanliness, and the general supply of lemon juice in the navy.

With regard to the rickets there is much ambiguity, for though it is first described by Glisson, and though it first appeared in the bills of mortality in 1634, there is great reason to believe, that it existed before that time, and the name of it in the bills is probably blended with other denominations of disease. There is no doubt, however, of the great decrease of it in common with the other complaints of children, which rendered the mortality so much greater among them formerly than at this time.

* Towards the beginning of the sixteenth century, the art of gardening in England was in so low a state, that Queen Catharine of Arragon could not procure a salad until a gardener was sent for from the Netherlands to raise it. It appears that the most common articles of the kitchen-garden, such as cabbages, were not cultivated in England till this reign.—See Anderson's History of Commerce.

Accounts have been kept in the bills of mortality since the year 1728, of the numbers who have died at different ages, and it appears that the number of deaths under two years, from that time till 1750, was annually from nine to ten thousand. In the latter half of last century they fluctuated from six to seven thousand ; and since the commencement of this century they have averaged under five thousand five hundred. This diminution of mortality among children seems imputable to the improvement in ventilation and cleanliness, and to the more judicious management of children, such as greater warmth in apartments and clothing, and the correction of the vulgar error that the exposure of children to the open air at all seasons is salutary, whereas this exposure in the winter and spring months brings on the most common and fatal of all the diseases incident to young children, while this practice prevailed, inflammation of the lungs. It is also highly injudicious to expose children to the open air in the early stage of hooping cough, for a catarrhal affection of the lungs, accidentally supervening, is the most common cause of danger and death in this disease. There can be no doubt that vaccination has also sensibly contributed to the present very great diminution of mortality among children.

It may here too be mentioned, that in the course of the last and the present century there has been a notable diminution of the number of

deaths in childbed. Improved ventilation and purity of air has probably been also the chief cause of this. It is a question how far improved medical treatment has had any share in it ; for it is alleged that parturition, being a natural operation, does not require the interposition of art in the human, any more than in the brute creation. This, however, seems more specious than solid ; for, the artificial life of the human species, particularly in civilised communities, tends in various ways to thwart pure Nature, and calls for the interference of art ; and there can be no doubt that the more rational treatment, founded on the improved state of medical science, has had a share in the more favourable results of these cases, as has been evinced among other proofs by the greatly diminished mortality in Lying-in-hospitals. Science tends also to repress an excess of obstetrical officiousness.

To the other description of diseases, namely, those which are more prevalent in modern times than formerly, belong the scarlet fever, consumption, gout, dropsy, palsy, apoplexy, lunacy, and generally all those diseases of which the brain and nerves are the seat, and of which the increased prevalence in this country in our times, is owing to there being a much greater proportion of the population who live independent of bodily labour than in any former age, and perhaps, something may be ascribed to the *use*, or rather the *abuse*, of tea and coffee, which certainly act powerfully

on the nervous system ; but this abuse, where it exists, is more than counteracted by their beneficial effects, as I have endeavoured to prove in the first article of this volume, page 55. The most recent of these is the *Neuralgia*, or *tic douloureux*, a very severe pain generally affecting the face, the superior frequency of which, since the beginning of this century, has been very striking.

The scarlet fever has been known in all ages. It is described exactly by Paulus Ægineta, and there are several distinct notices of it in the more early modern authors ; but in as far as we can gather from the records of physic, it is only in the last seventy years, that it has prevailed epidemically in different countries of Europe and in America. In this country it generally arises and prevails most in seminaries of education ; and it is perhaps to the greater extent to which this mode of education has been carried in our times, that we are to ascribe its greater frequency and prevalence, and its being a disease of which subjects under puberty are peculiarly susceptible, is in favour of this opinion. It seems hardly to admit of a doubt, that the supposed species of measles, called *Rougeole pourprée*, of which, according to Voltaire, so many of the royal family of France died, was the scarlet fever, as well as what is called by Morton the *putrid measles*.

The other diseases under this head, are plainly referable to the increased means of luxury, the

improvements in commerce, civilization, and the refinements of life.

The diseases chiefly incident to savage and barbarous nations are fevers,* fluxes, and rheumatisms. One cause of their being exempt from many diseases, is, probably, the loss of all those children in infancy who are weak and sickly, whereas, in civilised times, those who are saved by good nursing and medical skill, become the victims of other diseases in more advanced life. This may be one cause, at least, of the modern increase of consumption.†

But upon the whole, there cannot be a doubt that the present generation may congratulate itself on its improved condition with regard to those great sources of human misery, epidemic and endemic disorders.

The remote causes of all predominant disorders may be referred to three general heads, the vitiated exhalations and secretions of the living human body, the noxious exhalations of the earth, and depraved habits of life. The first includes the plague, typhus, dysentery, leprosy, and the venereal disease, together with all the specific contagions, especially those of the exanthema-

* See Rush on the Diseases of the American Indians.

† For the proofs of the increase of consumption, the reader is referred to the able and ingenious work of Dr. Woolcombe, intitled, Remarks on the Frequency and Fatality of Different Diseases. London, 1808.

tous kind ; the second consists of intermittent and remittent fevers :* the third comprehends palsy and other nervous affections, such as gout, dropsy, scurvy, rickets, and all the diseases referable to debauchery and immorality.

There are many complaints of which we are at a loss to make a comparative statement for want of records. As there is no nosological work, except such as are of a modern date, which professes to give a general account of all diseases, and as there is a great chasm of information in the dark ages, we are at a loss to know whether certain diseases existed or not in different periods and countries, and at what exact æra new diseases arose.† It is enough to know practically, that

* The several species of morbid matter generated by the living body, and that which is exhaled from the earth, may be viewed in the light of poisons ; and, as the same person must frequently be placed under the influence of both at the same time, certain modifications and varieties of disease must arise from this combined influence. This might be plausibly illustrated by reference to the nature and causes of several diseases, particularly the yellow fever ; but it would lead into too wide a field of speculation and conjecture to dilate now upon this subject.

† There are obscure notices respecting certain diseases, which make us regret much the great want of medical records in the darker part of the English history. For example : there is a fragment of an Act of Parliament preserved of the 8th of Henry the Second, (A.D. 1162) for regulating the stews, in which it is ordained, among other things, that no stew-holder shall keep

all the three remote causes, namely, contagion, noxious exhalations of the soil, and depraved habits of life, are by their nature very much subject to human controul. This affords us great encouragement in our endeavours to combat them. The counteraction of typhus by means of cleanliness and ventilation ; of the small-pox by vaccination in our own times ; and of agues in the country by the draining of marshes ; and in towns by the construction of sewers, and the cleansing of the streets in the seventeenth and eighteenth centuries, are undeniable proofs and triumphs of the power of human art in preventing and extinguishing diseases. The counteraction of the third class of causes consists in resisting the propensities to sensual excesses, indolence, and effeminacy, by good moral habits and self-command : remedies, the prescription for which, we must leave to the divine and moralist. It is not however foreign to the subject, and quite in character for a medical author to remark, that in virtue of those wise and beneficent adjustments of Providence, by which every department of Creation is made to harmonise with every other, the sound and morbid condition of the moral and physical world correspond with each other respectively : and it is observable that not

a woman who has the perilous infirmity of burning. See *Stowe's Survey*, v. 2. p. 7. and *Howell's Londinopolis*, p. 337. -

only those vices which consist in sensual excesses, such as ebriety and gluttony, lead directly to the injury of health ; but that with regard to the more atrocious vices and crimes, cruelty, oppression, and treachery, there is not one in a thousand whose conscience is so far blunted and silenced, as not to have their sleep, appetite and digestion, more or less disturbed, depraved or impaired ; so that the bodily health of man is bound up in one harmonious *whole* with his virtue, dignity and happiness, and we may without a metaphor enlist crimes, vices, and sensual excesses as so many items in our nosological muster of maladies. But without any such far-fetched apologies, the majority of readers will I think permit its intrinsic importance to plead for it. Though it was out of the rules of good taste for Cato to conclude his harangue upon whatever subject with the words *delenda est Carthago* we do not find that he was ever rebuked by any other senator exclaiming *hoc non est hujus loci*.

The only other important particulars that remain to be noticed, regarding the artificial means of maintaining health in modern times, is the use of linen and soap, the greater facility of procuring fuel, and the more ample supply of water. The frequent change of body-linen was not in common use till the eighteenth century. Soap was not manufactured in London till the year 1554. What was used before that time was brought from abroad or from

Bristol, where a coarse sort was manufactured.* There was no regular supply of coals† to London till the reign of Charles the First. It is almost

* See Anderson's History of Commerce, and Howell's Letters. Soap is a main article among the resources conducive to human health and comfort. The consumption of it has accordingly kept pace with the incessantly increasing taste for cleanliness, and the corresponding improvement in health. On the 27th of February, this year (1822), a curious and authentic proof of this occurred in the speech of Lord Liverpool, in the House of Lords, on the question respecting Agricultural distress. In order to prove that this distress did not proceed from excessive taxation, producing diminished consumption, but from the excess of the production and importation of corn above what the public necessities required, and the markets would bear, he adduced as one of the instances of encreased consumption, that of soap, which on the average of the years 1787 and 1788, amounted to 292,006,440 pounds; but the average of years from 1819 to 1821, amounted to 643,000,963 pounds. The soap used in manufactures not being taxable, is not included in these statements.

† The prejudice entertained against pit-coal as an article of fuel pernicious to health, was at one period so strong, that a law passed, making it a capital offence to burn it within the city, and only permitting it to be used in forges in the vicinity. The late Mr. Astle, keeper of the records in the Tower, informed me, that he there discovered a document, importing, that a person had been tried, convicted, and executed for this offence in the reign of Edward the First. There existed till lately in France a strong prejudice against the use of pit-coal. The universal and salubrious use of it in England for the last two or three centuries is a practical and unanswerable refutation of these allegations.

needless to mention, how much an ample supply of fuel is conducive to health, not merely for warmth and for culinary purposes, but as promoting ventilation, which it does not only by the change of air necessarily induced by the current of air up the chimney, but by enabling the poor to admit fresh air in cold weather. It is in the winter season, from want of fuel, that typhous infection is most apt to arise, and also to spread.

Those fevers which are generated solely by scarcity and bad food, as in the years 1801 and 1817, both of them from bad harvests, were not infectious in the opinion of the attending physician, a circumstance no doubt ascribable to the high degree of cleanliness and ventilation kept up in the feverhospitals on which this remark was made, and were instituted for preventing the spread of the infectious fever then prevailing in London. That of 1817 was by far the most severe, on account of the poverty of the labouring class from want of employment. All the remote and exciting causes of fever concurred in the calamitous typhus which broke out in Ireland in that year, for in the preceding year there was not only a failure of the crops of grain and potatoes combined with squalid habits of life, but the summer was so cold and wet that the turf could not be dried for the purpose of fuel ; and the same cold and damp weather was also highly unfriendly to health, in a

population badly clothed and sheltered. Its ravages were rendered still more extensive by its being incontestibly infectious, which made it spread to the upper ranks of life, and even to Great Britain.

A plentiful supply of water promotes health in a great city, not only by its application to various household purposes, but by cleansing the gutters and common sewers. The original supply of water was by conduits, conducting it from the adjacent fields. The water-works at London Bridge were first erected by a German engineer in 1581, but the supply was scanty till the formation of the New River in the reign of James the First. Other sources of supply have since arisen, as the metropolis increased, and the ingenious machinery of the steam engine has, since the beginning of this century, been applied for conveying and raising it to the tops of houses in all situations, and for extinguishing fires, affording a degree of abundance and accommodation in this article of life hitherto unknown, particularly at the west end of the town. And the unequalled health of this metropolis is a sufficient proof of its salubrity, although various accusations have been brought against those who supply it, by malignant and interested persons, who shamefully abused the public credulity, by groundless and delusive statements. It was stated in a return

made to Parliament in the year 1827, that the quantity of water supplied to each family in the parishes of St. George and St. James was three hundred and sixty-three gallons daily, including what was used in watering the streets. The supply of the other parishes was much short of this, but very abundant. The annexed Table is taken from this return.*

The watering of streets and roads, which used to be valued only for its effect in removing a disagreeable annoyance, is now justly considered as highly conducive to health. It has been observed with regard to some artisans, such as stone-

* *An Account of the quantity of Water served to the several Districts of London, as delivered to Parliament in the Year 1827, for Domestic Purposes and for Watering the Streets, exclusive of what was supplied from Springs by means of Pumps in the neighbourhood of each House, used for drinking, but unfit for culinary purposes, by containing a certain quantity of Saline or Selenitic Impregnations.*

Company.	Houses.			Daily Supply in Gallons.		
New River	-	{ between 66,000 and 67,000 }			-	13,000,000.
East London	-	-	-	42,000	-	6,000,000.
West Middlesex	-	-	-	15,000	-	2,250,000.
Chelsea	-	-	-	12,400	-	1,760,000.
Grand Junction	-	-	-	7,700	-	2,800,000.
Lambeth	-	-	-	16,000	-	1,244,000.
Vauxhall, or South London	-	-	-	10,000	-	1,000,000.
Southwark	-	-	-	7,000	-	720,000.

masons, flax-dressers, and needle-makers, that they almost all fall into consumption and die, owing to the irritation and festering from small particles of matter drawn into the lungs, and it cannot be doubted that the fine dust rising from streets has the like noxious effects; and it is actually remarked that coachmen are liable to consumption above the average of other men. Neither does it admit of doubt, that infection is conveyed by dust; for the virulent matter becoming dry, and subjected to friction, must rise in dust. And this is probably the main cause why the wetting of clothes and bandages of those affected with the plague is found advantageous in Turkey in preventing the spread of this horrible malady, and must be salutary in the case of other infections. For the like reason also, I have directed that floors of hospitals should be damped before the dust is raised by sweeping.

The foreigners who visited England in the sixteenth century drew a most disgusting picture of the uncleanly habits of the inhabitants of London, and of the filth of its streets. It is to foreigners * indeed that we owe most of our information on this subject; another proof that it is from *comparison* that almost all *observation* originates. In the reign of Charles I. there was considerable improvement; but it appears from

* Davenant's Work, p. 351. Lond. 1673.

cotemporary English writers, and still more from the accounts of foreigners,* that heaps of the most noisome filth were allowed to accumulate in the streets at assigned spots, called *laystalls*. It appears further, that the streets were then extremely narrow and ill paved, the buildings very crowded, and sewers very imperfect.† All this served as a *nidus* for the plague which broke out in the early part of the following reign.

It was not till after the Restoration, that those regulations and practices were introduced, which have led to the present salubrity of this city, and to those accommodations and elegancies which are peculiar to this age. It was not merely the rebuilding of that part of the metropolis which

* See Erasmus's letter to Sir T. More, and other learned men in England, after his return to his own country ; also Hentzner's Travels in England in the time of Queen Elizabeth ; and Davila's History of the Civil Wars of France.

† The construction of common sewers and the abundant supply of water have no where been more studied, nor better understood, than in ancient Rome. The sewers were so large and magnificent as to be reckoned among the wonders of the world, and founded at a period so remote as cannot be well ascertained by history. The salubrity of the city was still further promoted by Augustus, who introduced streams of water into it, as we learn from Pliny. The neglect and destruction of these by the barbarous conquerors rendered Rome extremely sickly, and it became so unhealthful in the twelfth and thirteenth century, that in a deplorative letter of Pope Innocent, still extant, it is stated that few of the inhabitants reached the age of forty, and hardly any that of sixty.

was consumed by fire in 1666, on a better plan, which effected the extinction of the plague and the diminution of some other infectious disorders. This was seconded by new and energetic measures, adopted by the legislature * as well as by the magistracy of London, for the removal of filth, the improvement of the common sewers, the widening and paving of streets. It was not till the next century that the cleansing of the streets was still further promoted by the removal of mud, and all manner of offensive substances to the fields, the improved state of agriculture having rendered it very valuable as manure to the cultivators of the land.

It is to the rapid increase of science and natural knowledge, which began in the latter part of the seventeenth century, that we are to ascribe not only this, but many other triumphs over the ignorance,† superstition, and barbarism of former

* See Statutes at Large, 19th of Charles II. chap. 3, Sect. 20, and 22, and 23d of Charles II. chap. 17 : also Acts of Common Council, copied into Hughson's History of London, vol. i. pages 242 and 259. The thinning of the population since that time, must have had the most beneficial effects upon health. It is remarked, in the Parliamentary Report of the enumeration and Parish Registers of 1811, Part II. p. 199, that the population of the ancient City of London had diminished by more than three fifths in the course of the last century, though the total population of the metropolis had nearly doubled in that time.

† The principal information on these subjects, in the begin-

ages ; and it must be highly pleasing to every cultivated and well-disposed mind, to contemplate the useful and liberal lights of knowledge advancing hand in hand with the energies of in-

ning and middle of the seventeenth century, is derived from the writings of Howell and Davenant ; and as a proof of the prevailing ignorance and superstition of that age, it may be remarked that the former, though one of the most eminent writers of that time, and historiographer to the King, not only maintains an argument in favour of the existence of witchcraft, but mentions with approbation the numerous trials and executions of the wretched beings accused of that imaginary crime, in 1646. He mentions that the number of those condemned and executed at the Assizes for Essex and Suffolk that year amounted to two hundred. Might not these strange delusions have been properly enough enumerated with the leprosy and sweating sickness, in the list of diseases which have disappeared ? Some of those accused of witchcraft, believed themselves to be guilty of it, and might not they, as well as others who believed it, be stated, without a metaphor, as labouring under a species of epidemical insanity, of a piece with the religious and political *mania* with which that age was infected ? Dr. Zachary Gray affirms, that he had seen authentic accounts of persons, in number from three to four thousand, who had suffered death for witchcraft in England. The like *mania* prevailed in France in that age. See Voltaire, Dictionnaire Philosophique, article Beker ; also a work entitled *Causes Célébres*, where some horrible enormities of the same kind are recorded, and perpetrated under the sanction of law and religion. Trials of the like nature occurred at Geneva in 1602, and at Wurtzburgh in Germany as late as 1752. The true and only antidote to this malady is the study of natural knowledge, so appositely recommended in those lines of Virgil, familiar to every scholar : *Felix qui potuit*, &c.

dust, lending mutual assistance to each other, and conferring on mankind the most substantial and practical benefits, none of the least of which is the improvement of health.

The fourth general head of causes influencing health are the climate and the fluctuation of the seasons. There has probably been but little change in the temperature of the atmosphere of this island since the ages in which it was overgrown with woods.* But this is by no means certain, there being no records on this subject on which to found a comparison, till the invention of the philosophical instruments in modern times. As it is in our power to gratify posterity on this subject, by affording them the means of comparison, it becomes us not to forego this claim to their gratitude.

* It appears from history that woods, when generally diffused over a country, have a very sensible effect in rendering the atmosphere colder than it would otherwise be. The air being a pellucid body is not warmed by the rays of the sun, except by the effects of refraction not worth estimating, but derives all its sensible heat from the surface of the earth, whether by propagation or radiation, and it is evident how wood must intercept this operation of nature. See an article in the *Phil. Trans.* vol. lviii. p. 58, by the Hon. Daines Barrington; also Robertson's *History of America*, vol. i. note 30.

TABLE

taken from the Register of the Royal Society.

	Greatest Heat.	Month.	Least Heat.	Month.
1771	⁰ 77	July	⁰ 4	February
2	81	June	10	January
3	81	August	32	February
4	$83\frac{1}{2}$	July	24	January
5	$83\frac{1}{2}$	April	$25\frac{1}{2}$	January
6	70	July	$13\frac{1}{2}$	January
7	84	July	19	January
8	86	July	22	January
9	85	July	20	December
1780	$84\frac{1}{2}$	May and June	20	Jan. and Feb.
1	80	Aug. and Sept.	21	January
2	82	June	$21\frac{1}{2}$	January
3	85	July	$8\frac{1}{2}$	December
4	78	May	9	February
5	83	July	10	February
6	$80\frac{1}{2}$	June	$11\frac{1}{2}$	January
7	$83\frac{1}{2}$	August	31	January
8	80	May	18	December
9	$74\frac{1}{2}$	August	$17\frac{1}{2}$	January
1790	86	June	30	December
1	80	June	21	December
2	84	August	19	January
3	89	July	28	January
4	84	July	22	January
5	$81\frac{1}{2}$	May	7	January
6	80	June and August	4	December
7	85	July	$20\frac{1}{2}$	February
8	86	June	11	December
9	77	June and July	17	December

There are five circumstances belonging to the seasons of this climate, which by their diversity and fluctuation, affect health. 1st. It is found

that, in a severe winter, a much greater number of aged people die, also of those who labour under chronic affections of the lungs, palsy, dropsy, and young children.* 2dly. There is a greater tendency to pulmonic inflammation in the spring months, in proportion to the prevalence of the north-east wind, periodical at this season. 3dly. There is greater tendency to *cholera morbus* in the end of summer and beginning of autumn, and this in proportion to the heat of the preceding summer. 4thly. There is a greater tendency to bowel complaints in general during all the autumn months. 5thly. The strength of the wind has an influence on health. Wind, by the wise ordination of Providence and the like is observable in the waters of the ocean, is the great ventilator of nature, (and what is artificial ventilation but an imitation of this,) and its effects have, perhaps, not been sufficiently appreciated. It is mentioned in Maitland's History of London, that for several weeks before the plague broke out in London, in 1665, there was an uninterrupted calm, so that there was not sufficient motion in the air to turn a vane. Baynard, a cotemporary physician, confirms this fact; and the like circumstance is mentioned by Diemerbroeck,† in the

* See Heberden on the Influence of Cold, Phil. Trans. 1796. Huxham computes that the mortality was six times above average in the cold winters of the years 1739-40-41.

† De Peste, l. i. cap. 6.

middle of the seventeenth century, in giving an account of the plague at Nimeguen. At the season in which the last plague visited Vienna there had been no wind for three months. It is evident that calms must favour the concentration of human effluvia, particularly in a crowded and uncleanly population : and by the concurring testimony of all authors, it was always among the poor and squalid that the plague made its first appearance, and among whom it was most prevalent and fatal. It seems a well established fact,* that the same morbid *effluvia* which produce typhous fever, give a susceptibility or predisposition to the attack of other febrile contagions ; and after such diseases have been produced, it is evident how windy weather must retard, and calm weather favour their propagation, by stagnation and concentration. As the plague existed more or less every year about that time, it is clear that the presence of infection alone is not sufficient to render it epidemic, and that some other cause or causes must concur. These, I conceive, chiefly to have been the accumulation of impure effluvia, favoured by calm weather, and concurring with a certain

* This principle is well illustrated in Dr. Heberden's work on the Increase and Decrease of Diseases, page 94, in which he is pleased to quote my Observations on the Diseases of Seamen, *passim*, and in the Account of my Visitation of the Army in Walcheren ; and a like instance occurred of dysentery, proceeding from the want of cleanliness and care at Flushing.

pitch of atmospheric temperature ; for it never appeared as an epidemic but in one season of the year.

During the twenty years which form the period of these observations, the only remarkable deviations from the ordinary course of nature, with regard to the weather, were in 1795, 1799, and 1800. The months of January and February, 1795, were colder than for many years before, or any year since.* Dr. Heberden remarks, that the mortality of January, 1795, exceeded that of January, 1796, by 1352.† The mortality of the whole year was 21,179, which is greater than that of any year since, except 1800 ; or for eighteen years before, except 1793, in which year there was a great increase of mortality from small-pox, and a considerable increase from fever. It appears from the Parliamentary returns,‡ that

* The mean height of the thermometer for these two months in 1795 was 30°.5. The mean height of the same months for the preceding five years was 40° 6', and of the following five years 39°.

† Phil. Trans. vol. lxxxvi. See a striking proof of the effect of cold in promoting typhous fever, Med. Trans. of College of Physicians, vol. iii. p. 245. The closeness of apartments of the poor in the winter months originated in the difficulty of procuring adequate fuel.

‡ As there had been no Parliamentary enumerations till after the expiration of the 18th century, the reader may be staggered at seeing an enumeration referred to for 1795 ; and ought to be informed, that these enumerations of the 18th century were not made by actual survey, but by calculations, through the ingenuity of Mr. Rickman. This gentleman deduced the number

there was considerable increase of mortality in 1795 all over England, in consequence of six weeks great cold in the beginning of that year, aggravated by the scarcity of crops, in consequence of the bad weather of the preceding year.

Result of the Average of Ten Years observation in London, previous to 1821.

Months.			Mean.	Max.	Min.
January	-	-	36	56	8
February	-	-	39	57	11
March	-	-	41	73	18
April	-	-	46	80	22
May	-	-	55	87	29
June	-	-	58	88	36
July	-	-	62	96	39
August	-	-	61	83	37
September	-	-	56	85	26
October	-	-	50	73	24
November	-	-	40	62	11
December	-	-	37	56	14

From the British Review.

The summer of 1799* was uncommonly wet and cold, and that of 1800 uncommonly hot and dry,

of inhabitants by a calculation founded on the number of deaths taken from the Parish Registers of that century, taking it for granted that the deaths and numbers bore the same ratio to each other in both centuries.

* The mean height of the thermometer this year was 47°.9. The mean of five years immediately before and after this year was 50°.6, which may be considered as somewhat under the general average of this climate; for the year of the cold winter, 1795, of which the mean was 49°.7, is included in this

no rain having fallen in London from the 4th of June to the 19th of August, except a very few partial showers. In both these years the crops failed greatly, so as to occasion distressful scarcity. The effect of this appears very sensibly, both in the abstract of population, and in the bills of mortality. Though the year 1800 had a very mild winter, the excess of mortality over that of the preceding year, namely, 4934, and deducting 600 for the excess of mortality of

calculation, the mean temperature of this climate may therefore be stated as 51° . The mean temperature of the three summer months of this year, was to that of the same months for five years before and after it, as $57^{\circ}.3$ to $59^{\circ}.6$. All these calculations are taken from the register of Mr. Six's thermometer (which indicates the highest or lowest point during the absence of the observer) without doors, in the *Philosophical Transactions*. The other thermometers generally report the mean three or four tenths of a degree higher. (See some interesting observations on this subject in the 5th vol. of *Phil. Transactions of Edinburgh*, p. 193, by Professor Playfair.) It is a matter of great curiosity, as well as utility, that the temperature of the atmosphere should be recorded in every age, in order to compare the course of nature at different times. The want of the thermometer in ancient times is an obstacle to accurate comparison; but the great and manifest phenomena of nature, as recorded by authors, prove clearly that the cold in the south of Europe was anciently much more severe than in our time. We read of ice anciently on the Tiber; and the weather on the coast of the Black Sea, now a mild climate, was in the days of Ovid as rigorous as that on the shores of the Baltic. Strabo says, that grapes would not grow in Gaul, north of the Cevennes, and that the rivers of Gaul and Germany were every year frozen over.

small-pox this year over the average of the five preceding years, 4334, was greater than the excess of the mortality in 1795, over the preceding year, which was only 1938, and allowing 437 for the diminished small-pox of that year, it was 2375. This was more particularly observable in the month of January so that it would appear that ; the bad crops of 1799 and 1800 were more hostile to human life than the very great cold of the months of January and February 1795. The mortality of 1801 was not indeed so much above the average of the preceding year,* notwithstanding the aggravated distress that might have been expected from two consecutive years of dearth, for the price of corn in these years amounted to double that of former years. The most probable causes of this, besides that of the most delicate having been carried off the preceding year, were the supplies from importation, the increase of wages, and of charitable contributions.

There is an observation deducible from these reports, which though not strictly belonging to this subject, I cannot help stating as a curious and striking proof of the influence of moral causes on the physical condition of man. In the year 1800 and 1801, the number of marriages was considerably diminished in the metropolis, and still more in the kingdom at large, in which the averages of

* See great light thrown on this subject by Mr. Rickman's Appendix to the Parliamentary Censuses, and also my Letter to Lord Spencer, reprinted in the Pamphleteer of January, 1817.

marriages for the five preceding years was 67,713 ; in 1800, they were 63,429 ; and in 1801, they were 63,840. This was evidently owing to the great discouragement to marriage that arose among the labouring order, from the difficulty of maintaining a family under the scarcity and high price of provisions. The number of baptisms is also considerably under average in these two years, and also in 1802, for an obvious reason. And the marriages in the two years after the scarcity were considerably above the average, in consequence of the marriages that had been deferred in the years of distress. It is deeply to be regretted that the salutary operation of these moral causes should have been sensibly impeded by a noxious practice, become since almost universal, whereby habits of virtuous frugality and industry are supplanted, by able bodied men and their families being supported from the funds levied for the indigent, the imbecile, and the aged, together with the removal of that wholesome restraint by which men are deterred from premature and improvident marriages, creating thereby that over-population which is one of the main causes of the modern misery of the labouring classes. More of this hereafter.

There has been no prevailing epidemic deserving of mention, exclusive of small-pox, during this period of twenty years, except an influenza in the spring of the year 1803.

It appears upon the whole, that, except in the

case of extraordinary cold winters, of which only one has happened in the above-mentioned series of years, the fluctuations of the weather in this climate do not much affect health in this age : and this affords a further presumption, that those fluctuations, called by Sydenham constitutions, do not, as he conceived, depend on any mysterious and inscrutable changes in external nature, but on the compound effect of the state of the weather, crops, and the concentration of human effluvia, which was more incident to that age than the present. This last was entirely overlooked by Sydenham, as well as by Mead and Huxham, who lived still later. They referred the whole to the state of the atmosphere, to planetary influence, or to mineral exhalations, giving rise to what they term *constitutions*, which can here only be viewed as hypothetical assumptions or conjectures.

And were we not in so many other instances to see how long the most obvious and useful truths have been overlooked by the most learned and sagacious enquirers, we should think it quite unaccountable how Dr. Short, a physician of great industry and research, who wrote as late as the middle of last century several elaborate works on public health and mortality, should never once advert to contaminated human effluvia, and impute so little to bad nourishment, as the causes of epidemics. Ventilation and cleanliness did not occur to any of these authors as the means of promoting public health. But from what has

been already stated, can any doubt remain, that to these we are indebted for the superior salubrity and the longer duration of life in the present compared with former ages? The sweet sensations connected with cleanly habits and pure air, are some of the most precious gifts of civilization. A taste for them tends to give a distaste to degrading and grovelling gratifications; and the common saying that "cleanliness is next to godliness" is founded on reason, inasmuch as it is conducive to moral purity as well as health and pleasure, as has been already remarked. The blessings of it are not yet so widely diffused in all districts and ranks of Society as they ought to be; and one of the main objects of the author in this dissertation, is to afford to posterity (if he may presume to hope that his humble labours will reach them) the means of appreciating, comparing, and improving upon the present age, in matters highly important to the health and virtue, and, therefore, to the happiness of our species. Ebriety being a vice to which the British populace is peculiarly addicted, no greater boon could be conferred on them than that of weaning them from their habitual indulgence in intoxicating liquors; nor any means so effectual for this end as giving them a taste for the sweets of cleanliness, fresh air, and genial warmth. It is indeed those tastes and habits of the liberal and educated classes of society, as contrasted with the vulgar

appetites of intemperance, which constitutes their distinction from each other.

What has hitherto been said relates to preventive medicine, and it has appeared that in this there is much reason to be satisfied with the efficiency of art. It becomes a question, whether curative medicine possesses equal powers. This will best appear from what remains to be stated in the farther prosecution of the subject.

ST. THOMAS'S HOSPITAL.

An Historical and Economical Account of one of the largest and most ancient of the Hospitals in this Metropolis, is one of the most likely means of conveying a true idea of the variety, fluctuation, and intensity of its Health and Sickness.

This hospital was originally an alm's-house, attached to a Convent of Friars ; and was converted into a receptacle for sick and maimed by King Edward the Sixth, at the Reformation, and endowed, like the other Royal Hospitals, from the spoils of the Romish church. Its funds were greatly augmented by King William and Queen Mary, who are considered as its second founders, and by private subscriptions and benefactions, which began in the same reign, and have continued ever since. It is situated in Southwark, on a tract of ground on the south bank of the Thames, which from Greenwich to Lambeth was originally swampy, and aguish ; but the parts which have

been drained and built upon have long lost that character. The soil upon which this and the other ancient parts of the metropolis are built is artificial, consisting of the rubbish of ages, substances which being hard and dry, must be favourable to health. But the situation being flat, and in the midst of a pretty dense population, the perflation is not so perfect, nor the external air so pure, as would be desirable in choosing a site for an hospital.* There is accommodation for four hundred and thirty-three patients. All the beds are generally full, except ten or twelve, which are reserved for sudden casualties. There were formerly near five hundred beds; but in the year 1783, when I was elected physician, febrile infection prevailed so much, that my two immediate predecessors, and one of the surgeons, beside several of the menial attendants, had died in the course of the preceding year of fever caught in the hospital, upon which the number of patients was reduced, and new methods of cleanliness and ventilation were adopted. All the wards have ever since been annually white-washed; the strictest attention has been paid to the cleanness of bed and body clothes, washing, sweeping, and all other means of removing offensive matter.

* Since the first edition of this work (1822) a much freer air has been furnished by the pulling down of the adjacent buildings.

Iron bedsteads had been adopted before this time, as less likely to contract and retain infection than those made of wood.

The new methods of ventilation consisted in making apertures at the tops of the windows, for the more free admission of the air. This was done by constructing the upper sash so that it could be drawn down, and by a board playing on a hinge immediately under this aperture, which being generally set at an angle to the horizon of about forty-five degrees, prevented the cold air from blowing on the patients.

The main principle of ventilation consists in admitting the fresh air somewhere near the ceiling; and if an issue is provided for the foul air at the ceiling itself, by means of a trunk carried to a certain height in the open air, and fitted with what is called a cowl, to traverse with the wind, the ventilation will be perfect; for the sick are thereby sheltered from direct streams of cold air, and the recent and vitiated exhalations from the living body having, by their warmth, a tendency to ascend, are effectually dissipated. In consequence of these precautions, no medical attendant has since been affected with the hospital fever; nor could I ascribe more than three or four deaths of nurses and patients to this cause during the whole time of my incumbency of twelve years.

The fatality, and slow recovery of sickness and wounds, is especially remarkable with regard to severe injuries, and the capital operations of surgery. It is a remark of Mr. Howard, in the account of his visitation of prisons and hospitals, that at the hospital at Leeds no case of compound fracture nor trepan survived, till the ventilation of the wards was improved. This was effected by causing large openings to be made over the doors leading to the passages. At the Hotel Dieu, formerly so notorious for its filth, bad air, neglect, and crowding, no operation for the trepan succeeded during the whole time that M. Marceau was chief surgeon, which was fifty years, insomuch that the operation was laid aside. Such are the circumstances which engender the hospital gangrene, and are to surgeons what typhous fevers are to physicians. The air may not be so foul as actually to generate these evils, but in any degree it retards sensibly all cures, whether surgical or medical; and it indispensably behoves all those who have the superintendence of hospitals not to rest satisfied with any thing short of perfect purity. Without this the most skilful treatment is thrown away. At the time in which the Hotel Dieu was so greatly mismanaged, there were seen three, four, and even five, in one bed. The rate of mortality was that of one in four, hardly any acute cases, child-bed

cases, or capital operations survived. About the beginning of this century, a remarkable improvement took place in the conducting of this hospital. Of late times it has been well ventilated, never over-crowded, cleanliness carefully studied, the result of all which has been that the mortality is that of one in eighteen or twenty.

One of the best authenticated proofs of the different influence of foul and pure air is in the Report of the Lying-in Hospital of Dublin. In the space of four years, ending in 1784, in a badly ventilated house, there died 2944 children out of 7650. After improved ventilation, the deaths in the same time, and in a like number, amounted only to 279. If pure air is necessary to preserve the health of the most hale and robust, how much more must it be so, when the powers of nature are weak, or under severe trials? In short, without pure air, the purposes of such institutions would be entirely frustrated. The utmost professional skill, and the most appropriate means of relief would be unavailing; and not only this essential end, but the secondary, though very important end of hospitals, as schools of experience and instruction, would also be defeated; for no scope could be afforded in such circumstances for practical deductions in estimating the merits of treatment and the virtues of remedies.

There are at this hospital nine wards for men, and six for women, besides two for men and one for women afflicted with the venereal disease.

The number of females who apply, and are admitted, is considerably smaller than that of the other sex. This seems to be owing to the former being less exposed to the exciting causes of sickness, such as cold, fatigue, and intoxication, and also from there being a less proportion of destitute strangers of this sex, as a smaller number of them resort to the metropolis, whether by sea or land.

The portion of cubic space allowed to each person is from seven hundred to a thousand feet. As far as I can ascertain, from my observations on civil, naval, and military hospitals, six hundred cubic feet is the smallest portion of space that ought to be allotted to each person, in calculating the arrangements of an hospital. If it fall much below this, it will be found impossible, consistently with safety from cold, to maintain a due purity of the air.

There were about fifty persons admitted, and about as many discharged, every week. The number of medical and chirurgical patients admitted were nearly equal; but as a smaller number of the latter is discharged on account of the more protracted nature of the cases, the majority of patients actually in the hospital was chirurgical.

The admissions and discharges are made only one day in the week, with the exception of accidents, for which there is at all times ready admission, without petition or recommendation. This regulation is well adapted to the commodious administration of the hospital, and does not seem materially to interfere with the humane purposes of the institution, except with regard to fevers. As the cases of this kind belong to the most indigent and squalid part of the population, it is clear that they are not only the most proper objects of relief individually, but with a view to the protection of the community, and they should be speedily admitted, in order to prevent the accumulation and diffusion of infection. Such cases are always most curable when taken early; and the utmost danger and distress may result to the individual, as well as his family and neighbours, by waiting for the return of the weekly day of admission. Acute cases also admit of more relief, and are a charge to the hospital for a shorter time than chronic affections, and the less so the earlier they are attended to. I have been told, that there are hospitals in which it is a rule not to admit fevers. It is difficult to conceive what idea the authors of such a regulation could form of an hospital as a beneficent institution, the end of which is the alleviation of human misery. Most probably the dread of introducing infection gave rise to it. On the contrary, it is demonstrable

that of all cases fevers are in every respect the most proper for being admitted into hospitals ; and I beg most confidently to affirm, from very extensive experience in the public service, that fevers brought from the most infected situations become quite innocuous to those who approach them, provided care is taken immediately on their admission, to cleanse their persons, by stripping and washing them, and cutting off their hair, and provided the hospital is as well ventilated as St. Thomas's has been for many years.

With a view to remedy these defects in hospitals, and to extinguish febrile infection when prevailing in large towns, institutions, called fever hospitals, and houses of recovery, have been formed in London and other large cities, and they have been attended with the most beneficial effects, particularly in Chester, Liverpool, and Manchester.

The comparative mortality at different hospitals is a most fallacious test of the success of practice, unless the nature and intensity of the several diseases are taken into the account. A large mortality may even be considered as a presumption of an hospital being well conducted, in as far as it indicates that the most severe disorders had been admitted, or, in other words, that the most judicious selection of cases had been made. But, in one and the same hospital, and administered on the same principle, the same

objection does not lie, and the comparative statement at different periods may be more fairly admitted in proof of the merits of its management. It is mentioned in some of the old chronicles, that the number entertained in the hospital at its foundation by Edward the Sixth, was two hundred and sixty ;* but there is no account of the mortality till 1689, of which year the printed annual report has been preserved ;† and it appears that the number discharged in the preceding twelve months was one thousand, six hundred and fifty-four ; the number buried two hundred and three ; and the number remaining under cure was two hundred and forty-two. The mortality therefore was about one in ten. The next printed report extant is that of 1721 ; but the in-patients being blended with the out-patients, in the account of the admission and discharge, no judgment can be formed of the rate of mortality. The number under the head of deaths applies only to in-patients, and that was three hundred and forty. As the hospital had great addition made to its funds at the end of the pre-

* See Hughson's History of London, vol. iv. p. 464.

† Since this was first written, I have met with an account of the cures and deaths in St. Bartholomew and St. Thomas's Hospitals in the year 1685, in a work of Sir W. Petty, entitled Political Arithmetic, p. 94. In the former, the number cured was 1764, the deaths 252. In the latter, the number cured was 1523, the deaths 209.

ceding century and at the beginning of the next, and was about the same time rebuilt on a larger scale, the numbers became nearly double of what they were originally. The annual report of 1741 is preserved in manuscript, in which the in-patients and out-patients are stated separately, and it appears that the number of the former discharged was two thousand four hundred and seventy one; the number buried, two hundred and ninety-six; and the number remaining, four hundred and forty-six: this makes the proportion of deaths one in 10.9. The printed reports do not state the two classes of patients separately till 1764. There was no increase of mortality in 1740, the year of the great frost, though there was a very sensible increase of it in the community at large, as appears from the bills of mortality. The reason of this, no doubt, is that few of the patients belonged to those classes who suffer from cold winters, that is, the very old, the very young, and the consumptive.

It has been remarked that about the year 1783, some improvements were made with respect to cleanliness and ventilation. In order to judge whether this made any sensible difference in the mortality, I compared the average of the ten preceding years, with the same number of subsequent years. I found the former to be in the proportion of one to fourteen, the latter of 1 to 15.6. The average rate of mortality for the next ten years was

1 to 14.2 ; but in the last ten years, that is, from 1803 till the present year, 1813, it has been 1 in 16.2. The average for the last fifty years, that is from 1764, at which time the accounts of in-patients and out-patients were kept distinct, has been one in fifteen. The mortality among the medical patients was considerably above the general average, as might naturally be expected from the more fatal tendency of sickness than of injuries and local affections. The mortality of those under my care was in the proportion of 1 to 9.8. In the tables of private practice the deaths are stated under each head ; but no inference can be drawn from this with respect to the success of practice, except in acute cases ; for in chronic cases it very frequently happens, that a physician's attendance is broken off before the termination of the case, whether in recovery or in death.

As both these tables are intended to exhibit the different degrees of prevalence in different diseases in these times, it is necessary to state certain exceptions to this. Neither of these tables shew the fair proportion of small-pox, nor of the venereal disease, nor of lunacy. The first are excluded from the hospital, and in private practice only a small number fall under a physician's care ; for the casual small-pox has for many years been almost unknown among the upper ranks of society, who chiefly employ

physicians, and the inoculated small-pox is, for the most part, so slight as not to require the attendance of a physician.

The great majority of venereal cases falls under the care of surgeons, both in hospitals and in private practice.

With regard to lunacy, there are hospitals for the indigent appropriated exclusively to this malady, and for the affluent there are private practitioners who devote themselves to the care of it, so that only a small proportion falls under the care of general practitioners. The like may be said of child-bed cases.

The hospital tables convey no information with respect to the relative prevalence of children's complaints, nor of consumption, these classes for obvious reasons not being admitted, except as out-patients.

I have placed small-pox in the list of those diseases which have been mitigated in this age. This effect cannot justly be ascribed to inoculation, for it has been satisfactorily ascertained, that the partial benefit of it to those who undergo it has been overbalanced by its favouring the casual propagation of it. But it is fairly due to vaccination, for the benefit derivable from it, whether partial or general, is without abatement or alloy. This subject is fully treated in a subsequent Dissertation.

By comparing the number of the several diseases in the hospital list with those of the private

list,* it will be discovered which of them are most prevalent in the different ranks of society. Those which stand most prominent for this prevalence among the lower ranks are intermittent fevers, rheumatism, dropsy, and continued fever. One twentieth of the whole number on the hospital list were intermittent fevers, whereas only one in one hundred and twenty-two belong to this head in the private list. Rheumatism constitutes one-fifth part of the hospital list, but only one twenty-sixth of the private list. One case in nineteen of all the hospital list is a dropsy, but only one in fifty-nine of the private list. The difference here, as well as in the last mentioned, is clearly traceable to the habits of life. It is evidently imputable to the greater propensity of the lower orders to intoxication, particularly from the use of ardent spirits. Neither dropsy of the breast nor of the brain enter into this calculation. Of continued fevers there are about one in eight of the whole number on the hospital list, and about one in eleven and a half in the private list. This may be easily accounted for from what has already been said of the usual origin of continued fevers.

* In making the comparison I have subtracted about five hundred from the total amount of private cases; for consumptions and small-pox are excluded from the hospitals, and a number of the catarrhs, children's complaints, and other cases are such as would not have found admission as in-patients of the hospital.

The diseases which stand most prominent for their prevalence among the upper classes of society, are gout, disorders of the stomach, and liver complaints. With regard to gout there were about twenty-three to be found in the hospital list, making one in a hundred and sixty-six, whereas there are about a twenty-sixth part on the private list. No disease affords so strong a proof of the power of habits of life over health. In further proof of this, I met with a few cases among the out-patients, who had either been upper servants in families, or keepers of public houses.

Disorders of the stomach constitute about a ninth part of the private list, but no more than a thirty-fifth part of the hospital cases. The reason of this is so obvious, and the fact itself so instructive as to need no comment.

The proportion of the diseases peculiar to the female sex in the hospital, is the same as in the private cases, from which it would appear, that the unfavourable influence of indolent habits, excessive delicacy and sensibility of mind and body in the upper ranks, compensate for the bad effects of hard labour and various privations in the lower orders, producing that equalization of human happiness and misery observable in other aspects of human life.

Of liver complaints, about one in forty-three belongs to the private list, and one in a hundred and thirty-three to the hospital list. This is partly

owing to the greater proportion of the better sort, who come from tropical climates, and partly from jaundice and gall-stones, being complaints of more frequent occurrence in sedentary and indolent than in active and laborious life. It appears from the tables, that there is a considerably greater proportion of apoplexies and palsies among the hospital than among the private cases : this is what we should not at first sight expect, and throws a doubt on the commonly received opinion of this disease being more common among the upper than the lower ranks of life. One cause of the great proportion of them among the poor may be, that exposure to cold and wet in their necessary occupations is a frequent occasional cause of it among them, as I found by questioning them at their admission. Another cause of this great proportion of them being found in the hospital may be that these cases are so severe, so sudden and helpless, that they are all sent as speedily as possible to an hospital in the manner of accidents, and this is so true, that at St. Thomas's hospital, an exception is made with regard to such cases, for they are allowed to be considered as accidents, and are immediately admitted. Some cases of hemiplegia occur in full habits ; some in spare and exhausted habits. The former being most incident to the luxurious and indolent, most frequently occur in private practice, and among the upper ranks of life. The latter occur more among the laborious classes,

and among such of the rich as are addicted to exhausting pleasures.*

With regard to the two sexes, there appear to be certain diseases exclusive of those peculiar to each, which are more incident to the one than to the other. The proportion of the total females to the total males in the hospital tables, is nearly two thirds; allowance being made for this, it will appear by inspection, that there is a considerable majority of males under the heads of intermittent fever, pulmonary complaints, bowel complaints, rheumatism, hemiplegia, other palsies, and dropsy. The only large head of disease in which there is a clear majority of females is cutaneous diseases. The cause of the great majority of intermittent fevers in the male sex has been already mentioned under the head agues. The reader will readily trace the causes of most of the other differences to the different constitutions and habits of life of the two sexes. With regard to the private cases, the number of each sex is not specified, but I find upon reviewing my notes, that they may be considered as equal. The diseases of which the great majority belong to the male sex, in the private list, are gout, pneumonia, asthma, rheumatism, palsy, especially that form of it called hemiplegia, the other species of palsy being

* See Lecture on Muscular Motion, page 29, read before the Royal Society, 1788, by Gilbert Blane, M. D. F. R. S. and reprinted in this work.

nearly equal. There is a majority of male cases under dropsy, but much smaller than in the hospital list. I find the number of cutaneous cases equal in the two sexes, in my private notes, and am unable to assign any probable cause for the great proportion of such cases among the females at the hospital.

The practical application of these comparative views to the regulation of life, as conducive to health, is too obvious to require comment.

It is very desirable that such views should be made available to the purposes of curative, as well as prophylactic, medicine. Let us try whether any useful deductions of this kind can be drawn with regard to the head of disease which stands foremost in the subjoined tables.

Continued fever may be considered as the principal source of mortality, and therefore the most important to be considered; and the first point to be ascertained with regard to its treatment is to satisfy ourselves how far the powers of nature are equal to its cure.

The powers of restoration essentially inherent in the animal œconomy, are perceivable in most diseases, and in none more than in fever. I have indeed elsewhere stated fever to be essentially a restorative process.* This does not preclude the interposition of art as an auxiliary to the

* See Medical Logic, 3rd Ed. p. 110

efforts of nature, which are frequently of insufficient power. The main point to be kept in view is, that no general rule can be applicable to all the variety of ages, constitutions, symptoms, and stages of the disease. In some, particularly young subjects, not vitiated by artificial habits, Nature is equal to the cure ; in others, depletion of the vessels and bowels, and antiphlogistic treatment are advisable ; in others, remedies of a stimulant and cordial nature have been known to save life. If this statement is correct, the perniciousness of all general rules and indiscriminate practice becomes apparent.*

It appears obvious with regard to this and all other diseases, that unless we can calculate with some degree of precision the extent of the powers of nature, we shall find it impossible to assign what is due to them, and what to the agency of medicine in framing our experience with regard to the treatment of diseases ; for without such discrimination we may not be able to satisfy ourselves, whether recoveries have been effected by *virtue* of medicine, or in *spite* of it ; and from such indefinite and equivocal views, we must frequently run the risk of congratulating ourselves on a great *cure*, where there may have only been a happy *escape*. With a view to resolve this important problem, it would be desirable some-

* See Medical Logic, 3rd Ed. p. 247.

times to leave nature to her own struggles, as a standard for observation in comparing the result with that which occurs under the use of artificial means.

In the present circumstances of society, practitioners would hardly find it either prudent or warrantable to institute such experiments. Facts bearing on this subject, are most likely to be met with in the infancy of the art, before the discovery of the numerous artificial remedies with which we now find ourselves armed, and which we think ourselves bound to employ. Accordingly, there is to be found, in the very cradle of physic, some highly interesting and satisfactory information on this subject. In the first and third sections of the works of Hippocrates, there are forty-two cases of acute disease, in which the patients are particularised by name, and the symptoms, daily progress, and termination of their respective disorders are related with the utmost clearness and the most exemplary candour. Of these, there were thirty-seven cases of continued fever without local affection. In the other five, there was inflammation on the vital parts. Of the former, there died twenty-one; of the latter, four. Among the former, are included four cases of child-bed fever, all of whom died; and two, consequent on abortion, both of whom also died. Of the five cases of local inflammation, one was of the brain, one of the throat, one of the lungs, one of the bowels,

and one of the liver. None of the subjects of these cases survived, except that of the lungs. The proportion of deaths therefore on the whole number was twenty-five in forty-two. In continued fever, without local affection, including the cases of child-bed and abortion, it was twenty-one in thirty-seven; exclusive of these, it was fifteen in thirty-one; and we have seen that, of local inflammations, four died out of five.

This statement is extremely instructive as well as curious; for it does not appear that any medical treatment was employed, except glysters and suppositories in a few, and blood-letting in one.

Little notice is taken of air or diet, and only one of the fatal events is imputed to mismanagement. This was the inflammation of the liver, in which it was alleged that the severity of the complaint was owing to the patient not confining himself in due time, and to his having eat animal food and drunk milk during his illness. The only active remedy mentioned in any of these cases, is that of letting blood at the arm in the pleurisy; and this is the only case of inflammation in a vital part which did not terminate fatally.

This record of remote antiquity, while it proves that near one half of those who are attacked with some of the most dangerous diseases incident to humanity may recover by the unas-

sisted efforts of nature, furnishes us certainly, at the same time, with a powerful and triumphant argument in favour of artificial means of relief; for the mortality far exceeds the proportion, not only in the annexed tables, but in any other modern statement with which I am acquainted, at least in temperate climates. It is even greater than the usual mortality in our tropical fevers, which is stated at 201 in 494.* The rate of mortality in fever, in St. Thomas's Hospital, was 1 in 9; in private practice, as exhibited in the annexed tables, it was one in seven, and in several coteremporary statements, published by public institutions, it is much less.

* See Edinb. Med. Journal, vol. v. p. 492.

ABSTRACTS OF PATIENTS

Taken in and treated by me at St. Thomas's Hospital, from October 1783, till April, 1794, with the exception of absences, which amounted in all to six months; so that the whole time was ten years.

Names of Diseases.	Admitted.		Died.	
	Men.	Women.	Men.	Women
Continued Fevers	288	205	25	29
* Intermittent Fevers	159	33	7	0
Pulmonary Complaints	231	90	51	19
† Bowel Complaints	189	75	29	9
‡ Rheumatism	523	204	10	3
Gout	23	0	0	0
Inflammatory Sore Throat	15	6	2§	0
Scarlet Fever	1	2	1	1
|| Chronic Sore Throat	5	4	1	0
Hemorrhoids	6	11	0	1
Small Pox	18	11	10	2
¶ Erysipelas	14	4	1	0
Stomach Complaints	70	40	8**	2
Vertigo, Chronic Head- Ache, and Gutta Serena }	46	15	2††	0
Neuralgia	1	0	0	0
Carried forward	1589	700	147	66

* There were eighty-three tertians, sixty-six quotidians, thirty quartans, and thirteen not specified. The deaths were all from dropsy, consumption, and flux.—† Of these there were thirty cases of painter's cholic, none of whom died.—‡ Two of the deaths were occasioned by flux, one by phthisis pulmonalis, one by sudden grief. § One by convulsions. There were very few of them acute cases.—One of the deaths was sudden, and could not be accounted for; the other was occasioned by phthisis pulmonalis.—|| Some of these were probably cases of Cynanche Laryngea, with the nature of which I did not become acquainted till afterwards by meeting with them in my private practice —¶ Many cases besides occurred in the hospital supervening on other complaints. ** One died of concussion of the brain, one of a mortification of the leg, two of pectoral complaints, one of a lientery attended with *aphthæ*. †† One of the deaths was occasioned by a mortification in the hip, after erysipelas in the face; the other was that of a boy with an overgrown head.

Names of Diseases.	Admitted.		Died.	
	Men.	Women.	Men.	Women.
Brought forward	1589	700	147	66
Epilepsy	16	17	0	0
Palpitation of the Heart	2	1	0	0
Insanity	2	4	0	0
* Locked Jaw	8	1	4	0
St. Vitus's Dance	7	1	0	0
† Spasms	3	0	0	0
‡ Tremors	6	3	0	0
§ Hemiplegia	47	21	4	1
|| Other Palsies	48	19	1	0
¶ Palsy from Lead and } other Metals	7	0	0	0
Dropsy	126	76	44**	33
Jaundice	9	6	2††	1
Inflammation of the Liver	11‡‡	3	4§§	2
Scrophula	35	10	2|||	0
Carried forward	1916	862	208	103

* Much benefit seemed to arise from opium, given in a cautious, gradual, and measured manner, also from the warm bath, and from anodyne and stimulant cataplasms. I have seen bad effects from opium, given hastily and to excess. In other respects there does not as yet seem to be any satisfactory practice ascertained. An inflammatory state of the spinal marrow discovered by late examinations, seems to indicate depletion more than hitherto thought of.—† One of these cases consisted in general spasms brought on by working in cold clay; another, in painful cramps without any ascertainable cause; the third proceeded from working in lead. ‡ One of these cases was that of a man, in whom it was brought on by working in quicksilver.—§ There were more seizures in the left side than in the right, in the proportion of about three to two.—|| Some were universal, some confined to the upper, some to the lower extremities, some alternate.—¶ One of these was a worker in brass, five were workers in lead, one became affected by handling printers' types while they were hot.—** One of the deaths was occasioned by the epigastric artery being punctured in tapping.—†† In one of these there was dropsy; in the other, a cancerous affection of the stomach attended with adhesion which obstructed the gall-ducts. ‡‡ Most of these were from the East Indies. §§ In two of these, there were abscesses found in the liver: they were both from the East Indies.—||| One died of a continued fever; the other of palsy.

Names of Diseases.	Admitted.		Died.	
	Men.	Women.	Men.	Women.
Brought forward	1916	862	208	103
Cutaneous Complaints.....	84	93	2	1*
Sea Scurvy	4	0	0	0
Pemphigus	1	0	0	0
Ophthalmia, Lippitudo } and Leucoma	15	5	1†	0
Diabetes‡	2	0	0	0
Other Urinary Complaints	39	15	3§	2
Venereal Complaints	137	65	1	2
Hydrophobia	2	0	2	0
Hydrocephalus	1	0	1	0
Tape Worm	0	1	0	0
Diseases peculiar to Wo- } men|| .....	0	256	0	18
Anomalous, obscure, and } complicated cases	205	132	21	9
Total	2406	1429	239	135

ABSTRACT OF CASES

Occurring in private practice, from 1795 till 1806.

NAMES OF DISEASES.	Number of Cases.	Deaths.
Continued Fevers	267	38
Intermittent Fevers	25	1
Pulmonic Inflammation	145	25
Phthisis Pulmonalis	129	65
Spitting of Blood	36	3
Catarrh	271	0
Asthma	63	1
Hoarseness	9	0
Carried forward	945	133

* She died of a bad ulcer.—† This death was from continued fever.
—‡ This disease, heretofore one of the opprobria of medicine, has been found lately by myself and others, to yield to the free use of opium. See an article on this subject by Dr. Warren, Trans. Coll. of Physicians. Bleeding, also oily friction on the skin, and above all, the abstinence from vegetable food, have been found good auxiliaries.
§ One of these deaths was from continued fever.—|| One of these was a case of menses occurring periodically from the navel.

NAMES OF DISEASES.	Number of Cases.	Deaths.
Brought forward	945	133
Hooping Cough	31	5
* Palpitation of the Heart and Angina Pectoris	21	4
Aneurism of the Aorta	1	1
Rheumatism of the Thorax	3	0
Anomalous Cough	3	0
Abscess of the lungs from old injuries	2	1
† Ossification of the Trachea	2	2
Peripneumonia Notha	10	1
Rupture of the Heart	2	2
Chronic Inflammation of the Larynx	1	1
‡ Sudden and severe pain of the Pectoral } Muscle of one side }	1	0
Loss of Appetite, Acidity and Flatulence in } the Stomach }	118	0
Carried forward	1140	150

* In one of these cases there was an extreme distress of breathing for five years, and the pulse fluctuated from twenty to thirty-two, never falling below the former point, nor exceeding the latter. Nothing gave material relief. Leave was not obtained to open the body after death.—One was cured by mercury, digitalis, and arsenic.—† These cases ought rather perhaps to have been stated as chronic inflammations of the *trachea*. In one of them there had been frequent tedious untractable catarrhs, for many years attended with a peculiarly sharp-sounding or ringing cough, *clangor*, and difficult expectoration, the necessary consequence of the rigid state of the *trachea*; for there are certain muscles composing the soft part of that tube, for the purpose of contracting its area, by the coarctation of the cartilaginous rings, in order to give greater *impetus* to the expired air in expelling redundant secretions, morbid matter, or extraneous substances. It is evident that this cannot be done where the rings are ossified. In the other case the symptoms were more distressing, for the dyspnæa was so severe, that the patient sometimes seemed strangled, and dropped down in a state of insensibility. Besides the ossification, there was found in both some portions of the lungs, of a consistence preternaturally dense, from bloody serum effused in the cells; but this was much more extensive in the second case, which accounts perhaps for the more severe sufferings.—‡ Cured by bleeding and antiphlogistic treatment. The blood was sizzly.

NAMES OF DISEASES.	Number of Cases.	Deaths.
Brought forward	1139	149
Hypochondriasis	57	0
Acute Pain of the Stomach	92	0
Laborious Digestion	2	0
Vomiting of Blood	10	0
Vomiting and Nausea	43	1
Inflammation of the Stomach	6	2
Water Qualm (<i>Pyrosis</i>)	12	0
Cancer of the Stomach	3	3
* Inordinate Appetite	1	0
Dull Pain of the Stomach, suspected to be } Rheumatic	1	0
Inflammation of the Bowels	29	6
Dysentery	38	5
Cholera Morbus	67	4
Ileus	4	0
† Diarrhœa	101	5
Colic	12	0
Intestinal Hæmorrhage	30	0
Piles	27	0
Coeliac Passion	6	2
‡ Obstructed Mesentery	94	2
Flatulence of the Bowels	4	0
Constipation	9	0
Lientery	1	0
Ulceration of the Bowels	1	1
Fecal Congestion	2	0
Gripping Pain and Diarrhœa after meals	1	0
Painter's Colic	2	0
Palsy of the Bowels	1	1
Acute Rheumatism	44	1
Chronic Rheumatism	75	1
Gout	130	7
Rheumatic Gout	5	0
Common Sore Throat (<i>Cynanche Tonsillaris</i>)....	51	0
Quinsy (<i>Cynanche Pharyngea</i>)	11	0
Carried forward	2111	190

* This case was attended with the hallucination of a live animal being in the stomach, and terminated in mania. † A considerable number of these were children.—‡ These were chiefly children.

NAMES OF DISEASES.	Number of Cases	Deaths.
Brought forward	2111	199
Mumps (<i>Cynanche Parotidea</i>)	3	0
* Bronchocele	2	0
Croup (<i>Cynanche Trachealis</i>)	3	0
† Cynanche Laryngea	3	2
Chronic Thrush	1	0
Angina pustulosa	1	0
Lumbago	2	0
Sciatica	3	0
‡ Chronic Headache	39	1
Vertigo	28	0
§ Mania	24	2
|| Epilepsy	16	2
Hemiplegia	36	19
Local Palsies	19	0
Paraplegia	4	0
Palsy from Lead	1	0
Catalepsy	2	0
Inflammation of the Brain	3	2
Lethargy	3	0
¶ Tinnitus Aurium	5	0
Intolerance of Touch on the whole skin	1	0
Hemicrania	3	0
Neuralgia, or Tic Douloureux	4	0
Gutta Serena	1	0
Tremors	3	0
Carried forward	2321	218

* Since the former edition of this work, there has been discovered a very well ascertained remedy for this and other glandular tumours, in the *iodine*, a new, curious, and very important article of the *Materia Medica*, and by far the most energetic of all the sorbifacients hitherto discovered. † One of these was an acute case, and ten years afterwards the same complaint returned in Ireland, and proved fatal; being the same individual whose case is related in Med. Chir. Trans. vol. iv. by Dr. Percival. I have since met with three chronic cases, all which proved fatal, after a long series of suffering from threatening suffocation. Two of them were inspected after death, and *pus* was found in all the interstices of the muscles and bones of the larynx, the organization of which was considerably impaired. ‡ See the fatal case related in the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, vol. ii. Art. 16 — § See one of the fatal cases related, *ibid.* — || In one of the cases, which proved fatal, the epidermis of the feet and hands came off from time to time in form of a glove. — ¶ In two of these cases the distressing symptoms were so unbearable as to end in suicide. I have since met with a case which

NAMES OF DISEASES.	Number of Cases.	Deaths.
Brought forward	2321	218
* Excessive Sensibility to Cold	2	0
Convulsions	8	2
Poisoned by Opium	1	1
† Chronic Suppuration of the Frontal Sinuses	1	1
Spasms	4	0
Raphania	1	0
Spasms of one side of the Neck	3	0
Small-Pox	15	3
Measles	32	3
Scarlet Fever	39	10
Chicken-Pox	2	0
Swine Pox (Pemphigus)	1	0
Erysipelas	91	2
Cow-Pox	8	0
Inflammation of the Liver	15	1
Jaundice	25	2
Obstruction of the Liver	12	1
Gall-Stones	12	2
Redundant Secretion of Bile	5	0
Vitiated and Redundant Secretion of Bile	2	0
Swelled Spleen	1	0
Inflammation of the Kidneys	9	1
Stone and Gravel	48	1
‡ Dysuria and Ischuria	20	0
§ Diabetes	5	1
Scanty Urine	1	0
Irritable Bladder	1	0
Ulceration of the Bladder	3	1
Carried forward	2688	250

was cured by half a grain of extract of belladonna three times a day. One case seemed to be cured by the third part of a grain of extract of belladonna three times a day in a pill of bread. Another by the infusion of it put into the ear; another by colchicum.

* In one of these there was no other symptom of indisposition; in the other there was a rheumatic affection. The first was treated with chalybeates, opiates, and strong aromatics, under which he recovered. The other was treated with arsenic, and recovered under the use of it.—† The matter was discharged by the nose. After fifteen years, there came on an irregular hemiplegia and stupor, and at last proved fatal.—‡ One of these was a case of *Ischuria renalis*, of alarming severity, and was removed almost instantly by the application of electricity.—§ This, from being one of the diseases most opprobrious to medical skill, is now one of the most curable, chiefly by opium, with animal and farinaceous diet, as already stated.

NAMES OF DISEASES.	Number of Cases.	Deaths.
Brought forward	2688	250
Incontinence of Urine	2	0
Bursting of the Urethra in Perinæo	2	1
Impotency	3	0
Emissio inconscia Seminis	2	0
Priapismus sine Libidine	1	0
Gonorrhœa Benigna	2	0
Excess of Venery	3	0
A peculiar species of Hectic Fever from Irritation of the Urethra*	3	3
Fluor Albus	46	0
Hysteria	97	0
Obstructed Menses	67	1
Profuse Menses	43	0
Scanty Menses	23	0
Pale Menses	5	0
Uterine Hemorrhage	1	0
Painful Menstruation	5	0
† Flatus per Vaginam	1	0
Vomiting of Blood, vicarious to Menstruation	3	0
Irregular Periods of Menstruation	3	0
Extra Uterine Fœtus	1	0
Cancer of the Womb	7	4
Cancer of the Mamma	4	2
Child-bed Fever	1	1
‡ Chlorosis	23	0
Induration of the Os Uteri	3	0
Cancer of the Mouth	1	1
Venereal Disease	32	0
Ascites	23	11
Anasarca	28	0
Hydrothorax	37	14
Carried forward	3160	288

* This was brought on by the repeated application of caustic, acting on infirm and irritable constitutions.—† A communication between the rectum and vagina had been produced by ulceration.—‡ One of these was a male of seventeen, who had all the characters of this disease; except that which is peculiar to the female sex. He was treated like the others, and recovered under the use of carbonated iron and aloes.

NAMES OF DISEASES.	Number of Cases.	Deaths.
Brought forward	3160	288
Hydrocephalus	15	11
Dropsy of the Ovarium	2	0
Encysted Dropsy of the Groin	1	0
Inipetiginous Affections	160	0
Carbuncle	3	1
* Shingles	5	0
Petechiæ sine Febre	2	0
Spontaneous Gangrene	1	1
Pruritus Pudendi	2	0
† Sea Scurvy	4	0
Nettle-Rash	1	0
Scrophula	37	2
Rickets	4	0
Teething	2	0
Ophthalmia	15	0
Lippitudo	2	0
Excessive Secretion of Tears	1	0
Deficient Secretion of Tears (<i>Xerophthalmia</i>)	2	0
Tape Worm	3	0
Lumbrici	2	0
Ascarides	12	0
‡ Old Age	5	4
Anomalous, Obscure, and Complicated Cases	375	77
	3816	384

* In one of these cases, the patient, after recovery, was for the remainder of her life, which extended only to a few years, almost incessantly tormented with a severe pain in the abdomen, in which nothing gave relief. On inspecting the body after death, it was found that immediately under the spot on the right side of the abdomen, which had been the seat of the shingles, and to which the subsequent pains had been referred, adhesions had taken place; and no doubt remained that these pains had been occasioned by the mechanical dragging of these attachments.—† In none of these cases, except one, was the disease occasioned by a life at sea, but arose from some peculiar propensity of constitution, under ordinary diet and habits of life. They were all cured by lemon juice.—‡ The most common symptoms characterising the disease of mere old age were frequent rigours, frequent and long-continued jactitations, producing a state of considerable suffering, and wearing out of the residue of life, by a sort of hectic fever. Their ages were from 80 to 99. It is here understood, as in many other heads of the preceding list, that those cases unaccounted for, which are chiefly chronic, were withdrawn from the Author's farther inspection.

DISSERTATION IV.

A Report on two Professional Missions, one to the Island of Walcheren, to enquire into the causes of the Sickness of the Army there in 1809—the other, to enquire into the expediency of establishing a Dock-Yard and Arsenal at Northfleet, in 1810. In these the origin, prevention, and treatment of INTERMITTENT FEVERS are particularly adverted to.

THE Author was charged by the Government of this country with a special mission to the Island of Walcheren, in the autumn of the year 1809, in order to ascertain the nature and causes of the great sickness and mortality prevailing in the British Army in Zealand, and to make a report of his enquiries. He was also sent by the Admiralty to Northfleet in the autumn of 1810, in order to investigate the nature and situation of that spot in point of health, with a view to decide whether any objection in point of unhealthfulness would arise to the formation of a projected dock-yard, and other naval establishments, at that place. In the exercise of these duties, he was enabled to elicit or confirm so many important truths for the future guidance of the public

authorities, that he feels himself called upon to give the utmost notoriety to them ; and has therefore made his report on these subjects an article in this collection of Dissertations, although he had published the greater part of it in the *Medico-Chirurgical Transactions*, in the year 1812.

In fulfilment of my mission to Walcheren, I visited all the hospitals, and inspected the whole returns of the army from the time of its disembarkation, in order to ascertain the progress and extent of the sickness and mortality. The result of these enquiries is what I now propose to communicate ; and, in describing the nature, and detailing the ravages of the prevailing disorder, I shall borrow the greater part of what I have to say from my official communications.

I arrived in the island on the 30th of September, and remained till the 13th of October following. During my stay I stated to the government, that I found so great a proportion of the sick to consist of those affected with the intermitting and remitting fevers, peculiar to marshy countries, that there could be no doubt but that the sickness of the army was owing to that cause.

The fever commonly called typhus, with which armies in ordinary circumstances, are chiefly affected, had been rare, and dysentery, which, in the history of former campaigns * in the Low Coun-

* See Sir J. Pringle's *Work on the diseases of the army*, in which there is a most accurate history of the diseases prevail-

tries, proved the most severe scourge to our armies in the autumnal months, had been as yet but little felt. Both these diseases, however, had begun to shew themselves at Flushing, where the accommodations were, at best, far inferior to those at Middleburgh ; but were then still more so, in consequence of most of the buildings having been injured by the shot and shells thrown into the town during the siege. In the large and elegant city of Middleburgh, the accommodations were excellent, as we had not only the advantage of the hospitals formerly belonging to the Dutch and French troops, but the spacious and airy warehouses of the Dutch East India Company, this having been formerly the great emporium of Indian commerce. Here I found no typhus nor dysentery, but the prevalence of these two diseases was very remarkable at Flushing, particularly in one regiment, of which all the medical officers were either absent or dead, and of which the sick originally affected with the endemic disease, were suffering also from typhus and dysentery, in consequence of the want of cleanliness, as well as of proper medicines, diet, and attendance. And here it is highly worthy of attention how one class of disease grows out of another ; for be it remarked, that while the sickness at Middleburgh consisted purely of the endemic intermitting in the British armies in Zealand and other parts of the Low Countries, in the campaigns of the years 1744 and 1745.

tent, under proper treatment, nursing, and accommodation, it degenerated at Flushing into dysentery and typhus for want of the advantages of the others, being thereby complicated and multiplied, and with the great additional evil of becoming infectious, to the inconceivable embarrassment of the service. And hence arises a further proof* of the necessity of general hospitals on actual service, as well to prevent the generation and extension of infection, as to provide relief to the regimental establishments when the sick and wounded accumulate beyond their means of accommodation. It is evident in the present instance, how necessary this is even in stationary service; but with regard to the ordinary service of a campaign, where armies are in motion, and where regimental surgeons and their assistants must be present with the regiments,

* And it might have been added, that hence also arises the necessity of never losing sight of the distinction between the terms endemic and epidemic, for it is to the indiscriminate and illegitimate application of these two words that great part of that spirit of controversy which has so unhappily infested medical writings, has taken its origin, generating not only animosities, but the most serious practical errors. And this is the more to be regretted and wondered at, when we see the line of discrimination so strongly marked. For the one (the endemic) takes its rise from the exhalations of the soil, the other, (the epidemic) from the morbid exhalations or secretions of the living body: the one, (the endemic) not being infectious; the other, (the epidemic) being infectious.

general hospitals may be regarded as absolutely indispensable. No system, however, could be so bad as that of establishing general hospitals, to the exclusion of the regimental, which also are indispensable in the movements of actual service, and have an advantage over the general hospitals by being on a small scale, whereby they more easily escape the greatest of all evils attending hospitals, that of engendering infection by crowding.* There ought also to be a liberal establishment of medical officers attached to general hospitals, in case of emergencies of service, and to fill up such casual vacancies as may occur in regiments.

I found myself under the painful necessity, therefore, of stating, that the sickness on this island had not diminished. It appeared from the latest general weekly return, that there were two-thirds of the whole numerical strength of the army incapable of duty. The mortality during the last four weeks had been about 1000. All the battalions were affected nearly in an equal degree by the endemic; and it does not appear that their illness was connected with the nature of their duty, or that it was owing to privations or neglect of any kind; for those were equally sickly, who had enjoyed the utmost ease and comfort in cantonments, as those who had been

* See this ably discussed by Sir James M'Grigor, in an article in the *Medico-Chirurgical Transactions*, vol. 6, p. 388.

engaged in the siege of Flushing, with the exception of the regiment left at this place, in which typhus and dysentery were superinduced by extraneous causes, as mentioned above.

Nor was this great sickness imputable to any thing unfavourable in the weather at this season, in comparison of former years. On the contrary, the native inhabitants affirmed, that they were then less sickly than usual at the same season of the year, and they accounted for this, from the uncommon quantity of rain that had fallen the last two months: for they consider it as fully established by observation, that the most sickly years are those, in which there has been great drought and heat in the latter end of summer and the early part of autumn; owing, no doubt, to the increased exhalation, and the more concentrated foulness of the stagnant water produced by these causes.

I found upon enquiry, that a like degree of sickness prevailed among the French troops who occupied Flushing during the last seven years; and that in former times, the Dutch troops, from the northern parts of the United Provinces, suffered equally. As the army had not suffered either from the scantiness and bad quality of provisions, nor from want of proper accommodation, nor from hardships and fatigue, it admits of no doubt, that the unfortunate state of the army here was solely imputable to the

contamination of the air from a soil the most productive of deleterious exhalations of any perhaps in Europe, producing an endemic fever which has at all times been particularly severe upon strangers in the autumnal months. I found also upon enquiry, that though this is by far the most sickly season, the residents of this and the neighbouring islands do not enjoy, at any season, the same degree of health as the inhabitants of the more salubrious parts of Europe.

From this statement, it will be clearly perceived, how much the causes of sickness were out of the reach of human controul. There were two facts, however, which afforded some encouragement for the employment of artificial means, in counteracting the overpowering influence of natural causes. One was, that those belonging to the upper orders of society in Walcheren were always less affected with its endemic fevers than the poorer inhabitants: the other, that the British officers suffered less in this campaign, than the private men, as will be seen by an abstract of the returns. As this latter must be owing to some circumstances of superior accommodation and diet, there was encouragement to attempt some improvement in these respects, though the situation of the common soldier was as comfortable as belongs to his condition. With this view I suggested the use of stoves in the barracks as well as the hospitals, in order to promote the dryness,

warmth, and purity of the air. I also represented, that considerable benefit might arise from the men being supplied with a hot breakfast. It may likewise be remarked, that those who slept in the upper stories of houses were less liable to the disease, and had it in a milder form, than those who slept on the ground floors. The testimony of the natives is also in favour of this observation. We had a striking confirmation of it in the visit we paid to the party accommodated at Fort Rammekins. The same fact is well established in the West Indies. Dr. Ferguson, one of the principal medical officers of the army in St. Domingo, in the late war, has remarked, that two-thirds more men were taken ill on the ground floors than on the upper stories. I have heard a similar observation made by Dr. Cullen, with regard to the sickness which prevailed at Porto Bello in the year 1740, where this eminent Professor in very early life was present. To the observation of General Monnet* (the French general who commanded during the siege) with respect to the good effect of a small quantity of ardent spirits in the morning, I may add a recommendation of mixing

* General Monnet was an officer of good judgment and great experience. He commanded the French forces in Flushing during all the seven years in which it was in their possession. A memoir regarding the preservation of health was found among the papers he left behind him after the capture of the island, from which this remark is extracted.

pepper freely with the broth and other articles of food. Of all the means of prevention, there are none perhaps more effectual than shelter and warmth. A very strong proof of this occurred in the case of a company of soldiers, whose quarters were better than common, and who when the others were employed in smoking their pipes and carousing with their comrades in the open air, spent that time in a spacious kitchen with a Dutch family. Only one man in this company was taken ill, while the others were attacked in the proportion already mentioned.

There were, in the beginning of October, when I arrived, considerably more than one-half of the army sick, or convalescent in hospitals. This amount was not owing merely to the numbers accruing from those who were daily taken ill, but was swelled in consequence of the small number of discharges, and the number of convalescents waiting for a passage to England: for under the influence of endemial air, recoveries were slow and imperfect, and relapses very frequent, not only among the few who were discharged, but among the convalescents at the hospital, some of whom, when apparently in a fair way of doing well, would unaccountably drop down dead. This made me urge the conveyance of such subjects to England, with as little delay as possible. There were then 6000 subjects proper for being transported to England; and I recommended, in con-

junction with Dr. Macgrigor, the superintendant of military hospitals, who arrived here a few days before my departure, that line-of-battle ships, with their lower deck guns taken out, should be sent from England for this purpose, there being at Walcheren only the means of conveyance for 1000 men. This measure was rendered further necessary, by the rapid accumulation of sick in the hospitals, some of which were already overcrowded, and, if not relieved, must in themselves have proved a source of additional sickness and infection.

One of the most important circumstances in the operations of marsh miasma on the human body is the power of habit in mitigating its influence. The natives are not a robust people ; they are of a very wan and sickly hue, with flaccid flesh, and have all suffered more or less from the bad air which they breathe. The children of both sexes are very subject to glandular and abdominal complaints ; and the adults, particularly those of the lower orders, have all of them, some time or other in the course of their lives, laboured under the endemic intermittent. They are, however, infinitely less subject to intermittent fevers than strangers. It was curious to remark, in conversing with the natives, even persons of education, and medical practitioners, that they would not admit their country to be more unhealthy than any other ; and when they were asked to

account for the great sickness prevailing among our troops, they mentioned some trivial circumstance in diet and habits of life, such as that they had seen a soldier eating a raw turnip, carrot, or apple, but would allow nothing to be ascribed to the insalubrity of the air. However unfounded this prejudice may be, it is strongly expressive of the great difference in point of health between natives and strangers. These strangers are also variously affected according to the district from which they come. It was found, that of the British troops, the natives of mountainous countries, and dry soils, such as the Highlands of Scotland, were more frequently affected than the natives of flat and moist districts, such as Lincolnshire. It is also well ascertained, that strangers, if they survive the first attacks, become thereafter much less liable to the endemic intermittents. This was well proved and illustrated in the *Mémoire* of General Monnet already quoted.

It was there recommended that troops should not be frequently changed ; for when it was the custom to send battalions from Bergen op Zoom, every fourth night, in succession, to work on the lines of Flushing, these men never failed, on their return, to be taken ill in great numbers. General Monnet therefore advised, however displeasing it might be to officers, that a stationary garrison should be retained in Walcheren, in order that it might be habituated to the air (*acclimate*,) and

he instanced a French regiment, which suffered in the second year of its being there only one-half the sickness and mortality which it suffered the first year, and hardly suffered at all the third. There were some other important remarks in this *Mémoire*, such as, that when it might be necessary to reinforce the garrison, this should be done early in winter, in order that the men might be habituated to the climate before the return of the sickly months, which he reckoned to be June, July, August, and September. He also recommended, that men who mount guard, or who are employed in any other duty exposing them to cold, damp, or fatigue, should have a double ration of spirits (*genievre*), and that there should be an additional allowance of this, and also of vinegar during the sickly months. Another remark of this General was very consolatory to us at this time, namely, that the oldest inhabitants did not remember a year in which this endemic had not disappeared before the end of October.

The expedition to Zealand sailed from the Downs on the 28th of July, and made good their landing on Walcheren, and the North and South Beveland, on the 31st of July and the 1st of August. The only military operation of any consequence was the siege of Flushing, which was invested on the 1st of August, and capitulated on the 15th of the same month. In the beginning of September, the islands of North and South

Beveland were evacuated, and that part of the army which occupied them returned to England, about eighteen thousand being left to garrison Walcheren. More than one-half of these died, or were sent to England on account of sickness in the course of the three following months ; and the island was finally evacuated on the 23rd of December of that year.

The following Tables exhibit a view of the course of the sickness and mortality. I was enabled to bring them down to the end of the campaign, the Commander in Chief having obligingly allowed me to extract from the returns deposited at the War Office, what was wanting in the notes which I had taken in Zealand.

I am also enabled to state, on the authority of Dr. Bancroft,* and Mr. Keate, the surgeon-general, that the whole number of sick sent to hospitals in Zealand, between the 21st of August and the 18th of November, 1809, amounted to 26,846, including relapses, and that the number of sick, including a small number of wounded conveyed from thence to England, between the 21st of August and the 16th of December, amounted to 12,863 ; and that many instances occurred in those who returned to England apparently in health, in whom the endemial disease of Zealand appeared after the slight fatigue of a march.

* Essay on the Yellow Fever, page 303.

TABLE I.

Account of the Sickness and Mortality of the Army in the Islands of Zealand, abstracted from the Monthly Returns, 25th August, 1809, and the three subsequent Months.

Head Quarters, Fort Bathz, South Beveland.

Date of the Monthly Return.	Total		Sick.			Died.	
	Rank and File and Non-Commissioned Officers.	Commissioned Officers.	In Quarters.	In Hospitals.	Total.	Rank and File and Non-Commissioned Officers.	Officers.
25 Aug. 1809	41642	1879	988	1713	2701	* 114	† 7

TABLE II.

Head Quarters, Middleburgh, in Walcheren.

Date of the Monthly Returns.	Total.		Sick.			Died.	
	Rank and File and Non-Commissioned Officers.	Commissioned Officers.	In Quarters.	In Hospitals.	Total.	Rank and File and Non-Commissioned Officers.	Officers.
25 Sep. 1809	16931	723	3829	5000	8829	883	29
25 Oct. . .	11921	611	2845	3027	5872	760	9
25 Nov. . .	6297	452	469	624	1093	196	3

* In this number 100 who were killed and died of wounds are included, so that only 14 died of disease.

† Of these one was killed as above, and 6 died of wounds, so that none died of disease.

TABLE III.

Account of the Sickness and Mortality in the Island of Walcheren, abstracted from the Weekly Returns, dated the 10th September, and the eleven subsequent Weeks.

Date of the Weekly Returns.	Rank and File and Non-Commissioned Officers.			Officers.		
	Total.	Sick.	Died.	Total.	Sick.	Died.
10 September	17870	6931	221	770	No ret.	4
17	17410	8141	277	765	235	7
24	16409	8754	287	782	191	3
1 October ..	16156	9127	254	748	172	2
8	15276	8969	217	719	168	3
16 .....	....	....	Return	mislaid	..	
23	13017	7145	128	655	113	
31	11747	6228	121	292	80	1
7 November	....	....	Return	mislaid	..	
14	8868	3799	40	559	45	
21	7926	1226	36	543	47	
29	6261	1158	30	383	30	

The first circumstance which strikes the eye on inspecting these Tables, is the smallness of the mortality in the first month of service. This not only proves, that several weeks are necessary for these deleterious exhalations to act upon the system, so as to produce disease, but that the rate of this mortality is so much less than in ordinary circumstances, as to stagger one's belief. According to the statement here exhibited, only 14 died of disease in 41,462 in a

calendar month, and not one officer. I at first distrusted my own accuracy in making the abstract ; but repeated examination convinced me that I was correct. I next distrusted the accuracy of the returns, but the adjutant-general assured me that there was not the smallest reason to suspect an error. According to the population returns of 1801, the smallest degree of mortality in any of the counties of England and Wales, was in Pembrokeshire ; and was 1 in 76. The greatest mortality was in London ; and was 1 in 31. But it is not fair to compare the mortality of an army with that of the general population ; for the latter includes all ages, sexes, and constitutions, whereas the former consists of the robust part of the male sex, in the prime of life. The computation being made on the like class, it would appear, that there is a much smaller rate of mortality than in people of the same age in England ; for, as has been already remarked, the mortality in civil life at this age in England is one in ninety-eight, and in select cases one in one hundred and thirty ; but the annual rate of it in this army, if computed by the month ending the 26th of August, would be only one in two hundred and forty-eight.

This low rate of mortality will appear in a still more striking point of view, when compared with that of fleets and armies elsewhere : for at Cox-

health, in the year 1779,* the annual mortality was at the rate of one in one hundred and nine, and during the time in which I kept records of the fleet in the West Indies, the lowest in any month, April 1782, was equal to an annual mortality of one in seventy-two; and the actual mortality about that time in the army on that station was one in four, and in some particular spots more than one-half.

The smallness of this rate of mortality in Zealand at this period, could not therefore be owing to the superior health and strength of those men who compose an army, above the persons of the same age, on whom the calculation is made in civil life. Was it not owing to this: that in the beginning of an expedition, men's minds are in that elated state, from the sanguine hopes of victory and success, which is favourable to health? I have remarked in a previous Dissertation, as well as elsewhere,† that in fleets, impressions of this kind have a striking effect on the health of men. An excited tone of mind, therefore, as well as youth and robust health, had a share in keeping down the mortality at this period. This however was of short duration: for it will be seen by the Table, that the sick had

* See Blane's Observations on the Diseases of Seamen, page 170. Third Edition.

† Ibid. page 77.

begun to increase rapidly at this time ; and that before the 10th of September, the mortality had become very great. As there is no account in these Tables, of the numbers taken ill in the intermediate times, nor of those discharged cured ; nor any accurate statement of the number sent to England from time to time, we have no scale of the decreasing sickness, as the season changed ; except the weekly diminution of the number of effective men. Thus it will appear by subtracting the sick from the total, as stated in Table 3d, that in the week between the 17th and 24th of September, the effective force was reduced from 9269, to 7655, so that one in 5.7, that is about two in eleven, had in that time become unfit for duty. It will appear by a like calculation, that on the 23d of October, the effective force was reduced to 5872 ; and that in the course of the succeeding week, it was reduced to 5519 ; so that three hundred and fifty-three had in that time become unfit for duty, that is one in 16.6, a proportion less than that in the preceding weeks ; the most susceptible being first taken ill : but the total seizures in five weeks was such as to reduce the effective force to less than one-third. No fair judgment can be formed from the returns of November, for reinforcements, of the amount of which I am uninformed, arrived from England in the course of that month, to assist in the evacuation of the island. From all the evidence how-

ever, I could procure, the number of seizures continued to diminish as the winter approached and advanced, conformably to what we had been told by the natives, as already stated.

The island of Walcheren is thirteen miles long from east to west, and nine miles from north to south. The capital of this island, and of all Zealand, is Middleburgh, an open town in the centre of the island, but communicating with the sea by a broad and deep canal, continued from a natural navigable inlet, leading to Rammekens, on the south-east quarter of the island. Flushing, on the south side of the island, is the principal seaport and arsenal, and the only place of strength. The whole island, with the exception of some hills, or rather mounds of sand, on the western shore, is a dead flat below the level of the sea at high water, and preserved from inundation by dykes. The soil consists of a fine white sand, known in the eastern counties of England by the name of silt, and about a third part of clay. It is divided into small square inclosures, by ditches, which serve as drains ; and these were about two-thirds full of turbid water when I was there. They emit no smell, that I could perceive ; but I was sensible of a bad smell proceeding from some ponds of stagnating water. The soil seems to be a mass of alluvial matter, like the deltas of great rivers ; and the whole islands of Zealand seem to have been formed by the *detritus* carried down by

the Rhine and Scheldt, and forming accumulations for a long series of ages. There is a poison in the exhalations from such soils, the nature of which is entirely unknown. It is not animal putrefaction; for it is perfectly well ascertained, that those who are exposed to putrid vapours, such as anatomists and tanners, are not affected by complaints of this kind; nor indeed by any complaint, unless these vapours are extremely concentrated; and the disease in that case is not an intermittent fever. Water, in a state of stagnation, without any ascertainable principle of contamination, seems to generate these miasmata, particularly after it has undergone exhalation, so as to bring the ditches or ponds to the consistence of mud. It is only from the absence of stagnation that we can account for the Delta of the Nile not producing the same disease as Zealand. This is so far from being the case, that Lower Egypt is one of the most healthful countries in the world, and is not infested with endemic intermittents. This remark did not escape the geographer* Strabo; and he assigns as the cause, that the stagnation of the water was prevented by the annual inundation of the Nile. It appears also, from the work of Sir James Macgrigor, that intermittent fevers, though not unknown, are not endemic in

* Vid. Strabon. Geograph. lib. 17, p. 1143, Amstelodam. 1704.

Egypt.* On the other hand, we know from the medical history of Minorca,† that, though this island consists of a rocky bottom, and very thin soil, yet in consequence of some stagnant water in channels and pools, severe intermittents are very common.‡ I need hardly mention, that the plague is no exception, this being a disease depending on *human* effluvia, and entirely unconnected with the nature of the soil.

An intelligent general officer, Sir John Moore, who was employed on the expedition to Egypt in the year 1800, and who had served in all climates, assured me, that he had no where seen so little sickness and mortality from disease ; for

* Vid. Medical Sketches of the Expedition to Egypt from India, by James Macgrigor, M. D. pages 99 and 163. London, 1804.

† Vid. Cleghorn on the Diseases of Minorca.

‡ There is another fact which may here be adduced, as a proof of the extreme obscurity of the nature of the remote cause of these fevers, lately stated in Mr. Crawford's Mission to Siam, in the years 1821 and 1822, page 60. The island of Singapore, in the Straits of Malacca, occupied a few years before as a depôt for the East India commerce, possesses all the supposed requisites which characterize the unhealthy districts ; a humid and extensive series of saline and fresh water marshes makes a profusion of decayed vegetable and animal matter, and yet this spot is entirely free from intermittent and remittent fevers. It is also worthy of remark, that the *malaria* of the *campania* of Rome is not confined to the Pontine marshes, which are too distant from them to admit the suspicion of their pernicious principle being wafted so far.

sickness, even including the plague, was less destructive than in any other country in which he had served ; insomuch, that there was here an exception to a rule, which holds every where else, that disease is more fatal than the sword ; for more were killed, or died by wounds, than by sickness, including even those who died of the plague. Nor can it be alleged, that humidity alone may have the effect of producing intermittent fevers ; for the vapour of pure fresh water, when not in a state of long stagnation, is found to be free from any bad effects upon the greater number of constitutions. It is remarkable, that though much greater quantities of rain fall in the western parts of England than the eastern, the average in some counties of the former being nearly double of what it is in those of the latter, yet it does not appear that health is in the least affected by this circumstance ; and seamen, even in the thickest fogs on the banks of Newfoundland, for many days together, preserve their health perfectly. When moist air is pernicious it is not so from its simple dampness, but from its being, when in its moist state, a better vehicle of morbid particles. This poison, therefore, is some principle, with the nature of which we are still unacquainted. There are also certain species of decayed organic matter, the exhalations from which are not at all productive of agues nor any

other disorder. I allude to bogs or peat-mosses. This is fully proved in Scotland, but still more in Ireland, where there are immense tracts of this soil, without any hurtful influence upon health. It might naturally be expected also, that the swamps round Venice would be productive of endemic fevers. This is not the case; and it would appear from this and other facts just mentioned, that the exhalations which convey the morbid poison are those emitted from fresh, and not from salt water.

The *miasmata* in Zealand, are more noxious than the like exhalations in England; the intermittents in the former being more violent, untractable, and fatal, than those which occur in the fenny counties, in the eastern parts of our own country. This superior violence is evinced by the higher degree of febrile heat and delirium, by the excessive secretion of bile, the want of distinct intermissions, and the more frequent swellings of the liver and spleen, these taking place in the course of a very few weeks, which in England seldom occur but under a long continuance, or from frequent relapses of the disease.

The exhalations of the soil in tropical climates extend farther, and are still more malignant than those of Zealand. Ships at the distance of 3000 feet from swampy shores, (a distance to which it did not extend in Zealand,) and even farther,

were affected by the noxious exhalations, according to my own observations and those of others in the West Indies ; and I have been credibly informed of the like fact, with regard to the India ships in the channel which leads to Calcutta. This great density and malignity of the exhalations might naturally be expected from the greater intensity of atmospheric heat.

A medical gentleman* belonging to the army in St. Lucia, one of the Caribbee islands, in the year 1781, at which time I was physician to the fleet on that station, favoured me with the following statement, and accompanying Table, which throw considerable light on the subject here treated of.

“ The fevers in general are of the low kind,
“ terminating in intermittents.

“ Unhealthy situations are the causes of many
“ diseases here, particularly the worst sort of
“ fever and intermittents.

“ One regiment, viz. the 90th, on the Morne
“ Fortunée, lost 271 men ; the 91st, on the side
“ of the hill 318 ; the 89th in *Grand Cul de Sac*
“ at the bottom 486.

“ The hill, or morne, is above the level of the
“ sea 872 feet.”

* Mr. Everard Home, Surgeon to the Forces.

STATE OF SICKNESS AND MORTALITY IN THE ARMY AT ST. LUCIA.

Strength of the Garrison.	The different Months.	Men in Garrison for Duty.	In Genl. Hospitals.				Prevailing Diseases.	Number of Sick.	Monthly Deaths.	In Regl. Hospitals.				Prevailing Diseases.	Number of Sick.	Monthly Deaths.	Total Sick.	Total Deaths.
			Fevers.	Agues.	Fluxes.	Dropsy.				Fevers.	Agues.	Fluxes.	Dropsy.					
2325	May.....	1784	50	14	36	5	Fever.	105	43	61	56	313	6	Flux.	436	16	541	59
1737	June	1093	57	9	43	4	Do.	113	68	65	56	413	0	Do.	534	68	644	136
*1912	July	1012	42	8	51	1	Flux.	102	68	105	94	589	10	Do.	798	125	900	193
1989	August.....	1084	34	19	83	8	Do.	144	110	127	202	427	5	Do.	761	142	905	252
1582	September...	899	33	29	86	10	Do.	158	101	100	161	261	3	Do.	525	152	683	253
1533	October ..	837	27	29	77	5	Do.	138	56	179	183	196	0	Do.	558	156	696	212
1401	November...	801	25	38	64	4	Do.	131	74	87	166	214	2	Do.	469	65	600	139
1286	December...	883	21	28	49	2	Do.	100	54	60	77	164	2	Do.	363	51	403	105
1268	January.	942	11	38	60	1	Do.	110	69	51	70	104	1	Do.	230	32	325	101
†1540	February....	1230	14	20	67	3	Do.	104	41	47	69	104	0	Do.	220	40	310	81
1554	March	1233	4	12	49	3	Dc.	68	32	77	80	93	3	Do.	253	32	321	64
1442	April	1172	12	21	33	0	Do.	66	15	72	68	71	1	Fever	212	29	278	44
			Died in General Hospitals.....						731	in Regimental Hospitals.....						908	Total	1639

* 46th and 5th Regiments joined.

† 37th Regiment joined.

It is evident, that the severity of the symptoms in the Zealand fever, added greatly to the difficulty of the cure ; and there could be no opportunity of employing Peruvian bark or other specific remedies, till its violence had abated, and the redundant bile had been carried off. The treatment of this acute state, consisted chiefly in giving such remedies as purged freely ; and in selecting them, the preference was due to those which acted most readily on the liver and bile, such as calomel ; those which were least heating, as the neutral salts ; and such as were best borne by the stomach, which, in a great many cases, was extremely irritable. In the course of the general inspection, in which my duty consisted at this time, I had not myself an opportunity of directing and watching the practical details of individual cases ; but I had considerable experience in this way, in my attendance on officers in England, who either brought the complaint with them, or were seized on the passage, or after their return to this country. I found that carbonate of magnesia, given as a purgative, in effervescence with lemon juice, remained on the stomach, when other remedies of this class were rejected by vomiting.

One of the medical controversies respecting the cause of intermittents, is founded on the difference of opinion on the question, how far the excess of bile may be considered as the cause

of them? It certainly cannot, in correct language, be called the cause ; otherwise every case of redundant bile, such as the *cholera morbus*, would be attended or followed by an ague. Certain it is, however, that epidemic intermittents not only occur exclusively in those seasons in which an excessive secretion of bile is most apt to arise, but every attack, whether original or relapsed, which I have seen, bore evident marks of an excessive flow of this humour. They seem therefore, to stand to each other in the relation of concomitant effects of the same cause, and not in that of cause and effect, so that the true statement of the fact perhaps is, that that state of the body in which there is the strongest tendency to a copious secretion of bile, either from the natural constitution, or the season of the year, constitutes a predisposition favourable to the action of the morbid exhalations. There seems in this something analogous to other facts which I have elsewhere noticed respecting the plague and the yellow fever, namely, that the human body is not liable to be affected by them, unless when predisposed by a certain temperature of the atmosphere. If the attack of this disease depended merely on the quantity of exhalations, they would be most frequent in June and July, when the heat of the atmosphere is highest. But there is a still more decisive proof of its depending on that season, in which the secretion of bile is most

copious, from this fact, that when those who have imbibed the poison, are transported into countries where the air is in a state of greatest purity, it is in the autumnal months that they are most commonly attacked. There was a very striking proof of this after the campaign of North Holland in 1799. In the following year some of the officers and men who had escaped the disease, were taken ill in England in the autumnal months; and none, that I heard of, at any other season of the year.

The greatest difficulties which occurred in the cure of those severe intermittents in their early stages, proceeded from great irritability of the stomach, which rendered it very difficult to exhibit either purgatives with a view to procure intermissions, or bark in sufficient quantity after intermissions had been procured. The best means I found, of obviating the first difficulty, was to purge with calomel, which, besides the advantage already mentioned, is, on account of its small bulk, swallowed without repugnance, and by its weight, is not easily rejected after being swallowed. Its operation should be assisted by neutral salts, and if these should be rejected, by considerable quantities of carbonated magnesia given in effervescence with lemon juice. It is sometimes, though very rarely, advisable to give mercury as an alterative. Ramazini * relates, that a

* De morbis artificum.

person affected with an obstinate ague was cured by mercurial friction administered for the lues venerea.—The second difficulty is one of considerable magnitude; for it is of the utmost practical importance to prevent the recurrence of paroxysms at as early a stage of the disease as possible; but the intensity of the fever, the imperfect intermissions, the obstructed viscera, and the inordinate secretion of bile in the Zealand intermittents, form serious obstacles to the early administration of specifics, particularly the bark. Those only who have witnessed the superior intensity of the intermittents of this country over the common agues of England, can be sensible of the importance of this remark. The rejection of bark by the stomach was obviated by substituting opium and arsenic with great caution and discretion. The stomachs of some patients were reconciled to the bark, by administering it with opium, or with magnesia in effervescence, or both: to others it was so insuperably offensive, that it could not be borne in any form, quantity or combination. In these cases the cure was effected by opium and arsenic, along with such bitters and aromatics, as the stomach would bear. Where the periodical paroxysms had not ceased, the tincture of opium was given from 30 to 50 minims, in the intermission, a few hours before the expected hour of seizure, accompanied with as much rhubarb as would counteract its restrin-

gent effects, keeping the patient warm in bed, and supplying him with hot drink. Sometimes the first administration of this stopped the paroxysm; but more commonly only alleviated it, and did not stop it until the second or third time. After the paroxysms were stopped, it was continued in smaller doses than at the former periods; and either bark, or, if the stomach would not bear it, arsenic,* generally combined with opium, was given in the intervals, till it might reasonably be supposed that the tendency to relapse had ceased. At this period, carbonate of iron was also given with safety and advantage, and with still more benefit at a more advanced period in order to obviate debility and emaciation, and to afford a still greater security against relapse, when there were no remains of fever, nor suspicion of local affection. I have cured intermittent fevers in which bark had failed, both in the West Indies† and in St. Thomas's Hospital, with the oxide of zinc; but I have made little use of this remedy since I became acquainted with the superior powers of opium and arsenic.

The duration of this tendency to relapse was very indefinite. There is a subtle, incomprehen-

* The dose was from six to twelve minims of the liquor arsenicalis of the London Pharmacopœia, three times a day.

† See Observations on the Diseases of Seamen, page 442. Third Edition.

sible impression made on the living human body by marshy exhalations, which, though attended with no immediate visible effect, so modify the constitution, that many months and even years afterwards, though the person has been living all the while in a pure air, an intermittent fever arises sometimes without any visible exciting cause; but this occurs most frequently in consequence of cold, fatigue, watching, privation of some kind, or, as has been before mentioned, on the return of the autumn. This, as has been already remarked, was strikingly exemplified in the troops who had served in the campaign in North Holland in September and October, 1799. Among these, was an officer who came to town to put himself under my care, in the month of August in the following year. He had belonged to an encampment at Swinley, near Windsor, a district not liable to such complaints; and he informed me, that not only himself, but others who had not been affected in Holland, had been seized with intermittents, and that this disorder was confined to those who had served in the above-mentioned campaign. I was informed in February, 1811, by a field officer, who came home from Portugal on account of bad health, that those men of his own regiment, as well as of others, who had served in Walcheren, two years before, were, on the first exposure and fatigue, rendered unfit for duty, chiefly by remittent fevers, so as to leave not more

than a third part of them fit for service, a proportion of sick, far above that of the army in general. This tendency obviously suggests the necessity of continuing the remedies, such as bark and iron, for a considerable time after all the symptoms of the complaint shall have subsided, and also of avoiding the exciting causes above enumerated.

I had, in the course of this service, an opportunity of observing the extent to which the noxious exhalations extended, which was found to be less than is, I believe, generally known. Not only the crews of the ships in the road of Flushing were entirely free from this endemic, but also the guard-ships, which were stationed in the narrow channel between this island and Beveland. The width of this channel is about 6000 feet: yet, though some of the ships lay much nearer to one shore than to the other, that is, less than one-half the distance above-mentioned, there was no instance of any of the men or officers being taken ill with the same disorder, as that with which troops on shore were affected.

It may not be improper here to glance at some of the principal disasters and miscarriages recorded in history, which have befallen armies, as has been already stated with regard to fleets. In this enumeration, perhaps, the crusades should stand foremost. But as the human mind in those

ages, laboured under a species of epidemic insanity, a narrative of this unexampled waste of human life from disease and privations, imputable to improvidence and neglect, can carry but little instruction in the ordinary conduct of human affairs. Let us rather quote what history records of the invasion of England by William the Conqueror, whose army was rendered nearly inefficient by the dysentery, and whose success was owing to the divisions and imbecility of his enemies ; or let us turn our eyes to what is related of the army of Henry V. which was reduced by the same malady from 59,000 to 10,000 men, previously to the battle of Agincourt, which, making every allowance for the difference of national prowess, was lost by the French from the misconduct of their princes, who commanded an army more vigorous and better appointed, and which out numbered the English in the proportion of four to one. The calamitous state of the army brought to England by Henry VII. previous to the battle of Bosworth, seems to have exceeded the miseries of either of these, for having been long detained in France and at sea from political causes, under singular circumstances of filth, of scanty and bad provisions, and deficient clothing, they suffered, not merely from the ordinary sickness and mortality incident to such a situation, but they actually engendered a new pestilential disease, the sweating sickness ; which

afflicted England for nearly seventy years afterwards. To these may be added the expedition to Cadiz under the Duke of Buckingham, in 1625, which was frustrated by sickness and want of discipline. The only memorable disasters imputable to sickness which occurred in the late war, were those which happened in the expeditions to St. Domingo and Walcheren. And though these were chiefly imputable to soil and climate, circumstances beyond human control, it is to be hoped that they will serve in all time to come, to enforce the necessity of statesmen rendering themselves acquainted with them, in calculating the risks of war. With regard to the service in the peninsula, which forms the great feature of the late war, there was perhaps no point in which the military skill of the renowned leader shone with more lustre, than in the arrangements and foresight, by which he preserved the troops in a state of efficient health. If there was any exception to this, it was in the state of the army after the retreat from Burgos, in the year 1813. In consequence of heavy rains, inclement weather, and other adverse circumstances, sickness made an alarming progress, and had it not been for the energetic measures, preventive, curative, and restorative, which neither by sea nor land have been understood, or practised till our times, adopted under the direction of Sir James M'Grigor, the Director General of

Hospitals, seconded by the illustrious commander the Duke of Wellington, the army would have been in no condition to meet the enemy in a few months afterward in the field of Vittoria. Among other authorities recorded of great commanders inculcating the importance of studying health, that of the great Frederic of Prussia may be quoted. He says, in the history of his own campaign, that one fever cost him as many lives as seven battles. He had fought sixteen pitched battles, as stated by himself in the same work. By one fever, he no doubt means a single epidemic in one season ; and as this no doubt was not the only one, the rest of the amount will be accounted for by losses sustained from other fevers.

What the author means to evince by these remarks is, that though history informs us of the success of armies under circumstances of the greatest neglect of health, this must be imputed, in most cases, to the like neglect of the enemy ; and it is clear that through those practicable precautions, by which the health and lives of men may be preserved, a decisive advantage in the saving of blood and treasure, ultimate success must fall to the lot of that party which employs them, over that which neglects them. In saying that he understood that no remedy was of much avail except emetics, the soundness of his Majesty's practice seems much more questionable than his assertion, that one fever cost him as many

men as seven battles. This statement of His Prussian Majesty may perhaps be understood as a rough computation of the whole loss from sickness in his armies in the course of the seven years war, and is probably much short of the real loss from this cause. There were indeed circumstances favourable to health in these campaigns, such as the seat of war not being in countries subject to endemic disorders, the armies never being so long encamped on one spot, as to engender much contagion, and the most exemplary discipline. Nevertheless, as the King at the conclusion of his history, states that he had fought sixteen pitched battles, and computes his total loss in the war at 180,000 men, the number of the deaths merely from the casualties of war will not account for so great a loss. His Majesty's own statement sufficiently accounts for the rest of the loss; for if one fever, that is the prevailing epidemic of one campaign, inflicted so great a loss as seven battles cost him, other epidemics may by the like rule be supposed to have swept away the great arrear unaccounted for in the preceding statement. In the most favourable circumstances, the mortality from the fatigues, exposure, and privations, inseparable from war, will ever greatly exceed that of the same class of men in civil life. In proof of the great advantage of keeping armies in motion, I may quote what I learned personally from General Pichegru, whom I attended in

an illness after his escape from Cayenne. Though he kept the field for two successive winters, which I believe is unexampled in the history of the wars in that quarter of Europe, yet no sickness arose in the armies which he led, except in a detachment which he sent to take possession of Sluys, in Dutch Flanders, which suffered from endemic fever. His army was not provided with tents; their only shelter in the field was huts. This high degree of health seems chiefly ascribable to the frequent movement of their position, the ample supplies derived from unsparing requisitions, and something may, no doubt, be attributed to the moral effect of political and military enthusiasm. It may further be remarked, that the armies of the continental powers have a great advantage over the English, in not being addicted to intoxication. There was a striking example of the benefit arising from the withholding of inebriating liquors, from its good effect in the garrison of Gibraltar, while the Duke of Kent was governor, for to no other cause could be ascribed the diminution of mortality during the time of his command there.

His Majesty of Prussia won many battles, but he also lost several, and would probably have lost fewer, had the means of maintaining health been better understood. There is a fine trait recorded by Plutarch, in his life of Alexander the Great, from which it appears that some knowledge of

medicine made part of his education, and that this mighty conqueror did not disdain to tend his friends in their illness, to compound and administer their medicines, and even their diet, being not merely a speculative *amateur*, but an actual practitioner of physic ;* and affords no bad reproof to that barbarous pride of birth and rank, the rust of feudal ages, now disappearing, which treated all the useful and liberal arts with contempt. What an incalculable saving would there have been of human life, treasure, and the whole material of war, had any of the members of the British government, whether statesmen or warriors, been conversant enough in history and medicine to have dissuaded them from undertaking the expeditions to St. Domingo and Walcheren !

It appears upon the whole, that the disorders, the prevention of which are chiefly under the control of commanders, are dysentery and typhous fever. Those depending on soil and climate are much less so ; but sufficient examples have been adduced to convince statesmen, and leaders of armies, that they would do well to make this one of the main elements of their deliberation in the planning of military expeditions.

* Δοκῆι δὲ μοι καὶ τὸ φιλιατρῆιν Ἀλεξάνδρῳ προτρέψασθαι μᾶλλον ἑτέρων Ἀριστοτέλης. οὐ γὰρ μόνον τὴν θεωρίαν ἠγάπησεν, ἀλλὰ καὶ νοσοῦσιν ἐβοήθει τοῖς φίλοις, καὶ συνέταττε θεραπείας τινὰς καὶ διαίτας, ὥς ἐκ τῶν ἐπιστολῶν λαβεῖν ἔστιν.

Report on Mission to Northfleet.

I had an opportunity of farther proving and illustrating the observations regarding the miasmata of soils, in the service I was sent upon to Northfleet in the autumn of the year 1810. The spot upon which it was intended to erect the proposed dock-yard and arsenal, is a marsh of about 700 acres. On the banks of the river both above and below it, there is a soil of a similar description, but not immediately adjoining to it on either side ; for above is the village of Green Hithe, which stands on a chalky bottom, rising to a few inches below the surface, and is a projecting point of the general chalky hills which compose the adjacent country. Below it, on the bank of the river, there is a similar intervention of chalk, where the village of Northfleet stands. Both these are nearly on a level with the marsh ; yet the intermittent fevers are almost unknown at either of them, whereas they are extremely prevalent on the adjacent hills. I found this fact analogous to some others to which my enquiries at this time led me. Dr. Maton informed me, that in the neighbourhood of Weymouth, though there is stagnating water near the sea, producing intermittents, these disorders are not known in the dry districts on each side, on a level with the water, but prevail on the adjacent hills. A Cornish gentleman stated to me, that at St. Blazey, between

St. Austle and Lestwithiel, agues prevail much on a hill adjoining to a marsh contiguous to the sea beach. And Major Rennell, the celebrated geographer, says, that in a district which he surveyed on the river Burrampooter, the waters of which overflow, and, upon retiring, leave an oozy flat, the agues prevail to the very summit of the adjoining hills. Lancisi* mentions a hill, on which the same sickness prevails, as in the marshy lands at the foot of it. An instance of the same fact in St. Lucia, has been already mentioned, and also that moist effluvia, when on the same level with the surface which exhales it, does not produce the fever.

It is known to every one, ever so little acquainted with the operations of nature, and indeed the common phenomena of clouds and rain render it obvious to the most ordinary observer, that water recently exhaled from the surface of the earth, has a tendency to ascend, and being lifted over parts on the same level, impinges on the neighbouring heights. There is reason to believe, that impure and unwholesome particles in general are attracted by, and combine with, watery vapors, for it is remarkable, that, in case of fogs, offensive smells are perceived, which in a dry state of the air, were fixed and quiescent.

* Vid. Lancisi de Noxiis Paludum Effluviis, page 120: Rom. 1717.

Though pure humidity, therefore is innocuous, it may prove pernicious as a vehicle of unwholesome volatile matter. In like manner, the poisonous principle of marshes, whatever it is, being engendered by moist soils, will naturally adhere to the watery vapors, and ascend with them.

There are facts to prove, that certain artificial changes, tend greatly to improve the air of particular spots. It is well ascertained, by the records of physic, by the bills of mortality, and by civil * history, that intermittent fevers were very prevalent in London, before the formation of common sewers, and the adoption of other means, such as paving, conducive to cleanliness and dryness, to which more perhaps than to the improved habits of life, in point of diet, may be ascribed the unexampled state of health in this great metropolis. There is a still stronger and more recent proof and illustration of this in Portsmouth, upon a flat, composing part of the marshy island of Portsea. I am assured by a medical gentleman who practised there, but is now retired from practice, that when he first knew that place, intermittent fevers were very prevalent; but the town having been drained and paved in the year

* King James the First and Oliver Cromwell, both died of agues contracted in London; and it is recorded in the Life of Sir Walter Raleigh, that he was affected with an ague at the time of his trial.

1769, that disorder had since been unknown there.* Hilsea, and other parts of the Island of Portsea have retained the same aguish character ; but this disease has greatly decreased there also, since a drainage, which was made in the year 1793. Numberless other examples might be adduced in proof of this, derived from the general improved state of health in various parts of the kingdom, in consequence of the inclosure of commons for the purpose of agricultural improvements, of which draining is one of the principal. This has been felt on the spot now in question, for I am assured by the Rev. Mr. Crackhilt, who has resided in the parish of Northfleet for forty-two years, that there has been in that time a progressive amelioration in point of health. It may indeed be affirmed as a general truth, that, all over the world, the great difference of one country from another, in point of salubrity, con-

* It appears from the late Parliamentary Report, that Portsmouth has had an accession to its population during the preceding ten years, of 8401 inhabitants ; that the healthfulness of it has encreased, the proportion of deaths in 1800 having been one in 28 ; in 1810, one in 35 ; both computations being taken on an average of three years. Plymouth, and Plymouth Dock, now named Devonport, in the same time has acquired an additional population of 12,866, and the mortality has varied but little, having been one in 27 in 1800, and not quite one in 28 in 1810. The population of Portsmouth, by the last Report, was 40,567 ; that of Plymouth and Devonport, 56,060.

sists in the greater or less proportion of that soil which emits those noxious effluvia that produce intermittent and remittent fevers.

Is it not owing to a like cause, that the houses are most sickly that have a garden adjoining them, as observed by Mr. Sismond, in his *Tour in Italy and Sicily*, 1827. The ancients ascribed the superior health of the closely built parts of the town to the interception of the sun's rays, conceiving the direct influence of them to be extremely pernicious.

One of the objects prescribed to me on my visit to Northfleet, was to ascertain how far the health of that spot might be affected by the exhalations from the Essex side of the river. What has already been said on this subject relating to Zealand, affords an answer to this question; the width of the channel between Walcheren and Beveland being about six thousand feet, and the breadth of the river at Northfleet, according to a plan in the possession of Mr. Rennie, the engineer, being three thousand feet. The distance of Essex from the banks of the river at Northfleet, is therefore about the same as between the ships riding in the middle of the channel, between the shores of Walcheren and Beveland. What has been said on this subject therefore is an answer to this.

I was farther informed by Mr. Rennie, that in boring the ground at Northfleet, he found that there were beds of chalk and gravel underneath

the clay : so that these materials, when they shall be thrown up in making the future excavations, would render the surface dry and wholesome, and that he had calculated that their quantity would be such, as to raise the artificial surface eighteen feet higher than the present natural surface.

Taking into consideration, therefore, the great changes which would take place in the marshy spot, on which it was proposed to erect the docks and arsenals ; in consequence of the excavations, the drainings, the pavings, buildings, and various other operations for forges and other machinery, I gave it as my opinion, that no solid objection would arise to the plan proposed.

DISSERTATION V.

Remarks on the Progressive HEALTH and POPULATION of England.

Since the former edition of this Work, nine years ago, more new knowledge has accrued in all the arts of life than perhaps in the like lapse of time in any age of the world, as far as the lights of history inform us. In the midst of this it is to be hoped that medicine has not remained stationary, particularly as some of the most favourite and eager pursuits of the present times on subjects of philosophical and political science have a strong bearing on those branches of knowledge which entitle our profession to rank among the literary and and scientific, as well as the dignified and useful classes of social and civilized life. The author here alludes to the intense study which has of late been bestowed on the cultivation of what maybe termed Human Statistics, a science, which in its most extensive sense, has as much relation to human happiness as any that could be named ; and it is needless to say, that of all its elements none is more prominent than Health ; and it is equally evident how much Population, whether considered as to its amount or its welfare, is connected with

it, so as to embark the Statesman, Politician, and Physician, in one common pursuit.

With a view therefore to a fundamental enquiry into this subject, the writer sets out with remarking, that it will throw some light on the multiplication of the human species to premise the consideration of it by a hasty sketch of the same principle in the other subjects of Organic Nature.

The most remarkable circumstance with regard to the Kingdoms of Nature, is the great anxiety (if it is not speaking too irreverently) of the author of Nature to provide against their extinction by the stupendous multiplication of the seminal principle. In the vegetable, the simplest of the departments, this is matter of palpable proof to the most superficial observer, in contemplating for instance the profusion of seeds scattered over the fields, as exemplified not only in the down of thistles, but more strikingly in those grains which constitute our subsistence in the form of farinaceous food. A very small proportion, however, of these is required, and actually applied to the purpose of perpetuating the species, whether scattered casually, or by the hand of man. This unbounded germination is checked, partly by their becoming the food of animals, partly by the want of space to contain them.

The like wisdom of Providence is observable in the animal kingdom, whether terrestrial or

marine. It has been computed that there are as many eggs in the roe of a certain fish as there are individuals of the whole human race. There are few problems in Nature in the solution of which naturalists are more at fault than the disposal and nutrition of the finny family. It is proverbially true that they prey upon each other; but it is so much even beyond conjecture, to ascertain what is the ultimate food of fish, that it is the tenet and belief of some of the most respectable enquirers into this department of nature, that the last fishes which those next above them make their food have no sustenance but water. The phenomena of the immense shoals of herrings, and the fact of gold and silver fishes living without any visible food, are some of the grounds upon which they found their doctrine. The *amphibia* bear a greater resemblance to fish than land animals in their redundant procreation.

The abundant and apparently redundant multiplication of land animals is not less conspicuous. The bountiful Creator however has provided such sufficient sustenance for them in the spontaneous productions of other organic creatures, animal and vegetable, as not to allow them to perish through famine, whether in the seminal, fetal, immature, or adult state. Their perishing by famine seems mainly to be prevented by their preying on each other, or by being the prey of man, whether in their wild or domestic state.

Though there seems a smaller redundance in the procreative powers of land animals than of fish and *amphibia*, there is nevertheless a tendency to multiply far above the mere purpose of their perpetuating the species. As the rate of this multiplication must in the nature of things be geometrical, the comparative rapidity of it in different species must depend on the number brought forth at each birth, and the length of the interval between birth and the adult age. For these reasons it is that the human species is one of the slowest in its multiplication. Yet slow as it is, we find it far above what any actual scale of subsistence could bear, as a moment's consideration will evince. For, according to the natural law of human life, the species could by possibility double in fifteen years, but let us call it twenty; and let us call the present population of England twelve millions, which it must by this time exceed, for by the last census, nine years ago, it was 11,261,437, and the increase the preceding ten years 1,722,610, both exclusive of Wales. Under this moderate assumption therefore, the population in twenty years would reach twenty-four millions, and in another twenty years would amount to forty-eight millions, requiring an amount of subsistence far above what any fertility of nature ever known could supply; so that the question now becomes not by what rules and laws population is maintained, but how it is to be repressed, so as to adjust it to subsistence.

On all questions relating to this subject, the political and philosophical world is deeply indebted to Mr. Malthus. By a happy mode of illustration he has grounded his arguments on a principle that while, as has been above stated, the species has a tendency to multiply geometrically, food can only increase arithmetically ; and has, in the view of those who comprehend him, followed up his reasoning with great powers of logic and language, equally sound and correct as they are eloquent and persuasive ; and though he has done so with great liberality of mind and temper towards his adversaries, he has himself experienced a very opposite treatment.

In comparing the human with the brute creation one of the most distinctive features is the very great apparent advantage which mere animals enjoy above rational beings when ushered into the world, by which is here meant not only the helpless state of infancy, but the natural want of defence of the species at large, not by being provided either with covering against cold, nor with arms of offence and defence, like the animals which range the forests, the waters, and even the air ; and to which he would at first sight be supposed to fall an easy prey. Such however is the power of Reason with which the Almighty has endowed him, that he has been enabled not only to defend himself from their attack, but to assert his supremacy over the strongest and best armed of them.

Another peculiar feature of rationality is, that man, in the rudest state in which he has ever been found to exist, has instituted Marriage in some form or other, so as to save him from the degradation of being brought on a level with the brute creation by promiscuous intercourse.

A third feature peculiar to man as a rational being is, that it has pleased the all wise and beneficent Creator to implant in his moral nature among other virtues that of Chastity; by which constitution he is not only dignified, but so checked by the self-command of his appetites, as to prevent his excess of multiplication.

A fourth distinctive token which characterises the lords of the Creation is, that while other animals are maintained by the spontaneous productions of nature, he is doomed to effect this by the sweat of his brow. It is demonstrable, that if man had been furnished with spontaneous food, clothing, and shelter, so as to supersede labour and industry, as in the case of light, air, and water, none of those attributes, which constitute his happiness and dignity, could ever have been developed. In such a state of things there could have been no property, no play for the active and inventive energies of man, whether mental or corporeal, no room for the talents exercised in productive industry and commercial enterprize, all the mutual and endearing ties and dependencies of social and civilized life, all the

trades, professions, arts, and sciences, whether ministering to those accommodations and elegancies which, in various degrees, constitute a considerable proportion of the felicity of civilized life, whether as objects of pursuit or enjoyment, would have been untasted, because unknown. This remark holds strikingly true as it regards agriculture, which made its first appearance at the very dawn of civilization, as one of the obvious wants of rational nature. This is proved and finely illustrated by Homer, where, in the passage regarding Polyphemus, he so happily contrasts savage life with the cultivated, by typifying the former under the personification of the monster of the cave, with those of refined ages, whom he calls ἀρτοφαγοί, that is, eaters of bread, implying that agriculture was their most characteristic feature: and can any thing be more beautifully illustrative of the same subject than the lines of Virgil, so familiar to scholars—*pater ipse colendi haud facilem*—Cicero, with equal eloquence says, *Nihil agriculturâ melius, nihil uberius, nihil dulcius, nihil liberi hominis dignius: nothing more becoming a gentleman*, however remote from that relict of feudal barbarism, which reprobated it as the most degrading of all occupations. Of all the funds of virtuous labour this is assuredly the most prominent. But without proceeding further, great light will be thrown on the subject by a glance of the eye on the two following Tables.

POPULATION OF ENGLAND,

Taken from Censuses, exclusive of Scotland and Wales.

Computed from the data furnished by Domesday Book, the title of a Survey made between the years 1081 and 1086*	-	-	1,589,609
Computed from an enumeration of all those of both Sexes under the age of fourteen, in the year 1377†	-	-	2,108,000
Computed from an enumeration made of fighting men, reckoned about one in five of all ages and sexes, on the approach of the Spanish Armada in the year 1587	-	-	4,688,000
Extracted from a computation made through the whole of the 18th century from the Registers of Baptisms, by which the number of the Population in 1700 was found to be	-	-	5,108,000
in 1750	-	-	6,017,700
in 1801	-	-	8,331,434
The last Statement belongs properly to the following century, but differing only one year, it was thought unnecessary to make a separate Statement.			
Calculated from actual enumeration			
in 1801	-	-	8,331,434
in 1811	-	-	9,538,827
in 1821	-	-	11,261,437

* The three most Northern Counties were not included in this Survey. It is nevertheless remarkable enough that the encrease of population in ten years, viz. from 1811 to 1821, being 1,722,610, is more than the whole population as above stated at the Conquest.

† Preparatory to the levying of a capitation tax in the reign of Edward III.

The following is a statement made by Mr. Rickman, and will afford still more satisfaction regarding the progress of Population in modern times, calculated retrospectively from the ratio of baptisms to the total population, founded on an examination of the baptismal register in the census.

The Population in 1700	.	.	.	5,475,000
in 1750	.	.	.	6,467,000
in 1770	.	.	.	7,428,000

The first actual enumeration in England and Wales in 1801, gave a Population of 9,168,000

Mortality 204,434—1 in 44.8

In 1811, a Population of . 10,488,000

Mortality 208,184—1 in 48.7

In 1821, a Population of . 11,977,663

Mortality 208,349—1 in 57.6

From which it appears that the proportion of the population of England at the Norman Conquest was that of about the seventh part, soon after the middle of the sixteenth century that of somewhat more than a third part, and at the beginning of the eighteenth century about one-half of what it was in the year 1821. It appears further from an inspection of the Table, that this increase was rapidly progressive during this series of ages, for between the Conquest and the reign of Edward III. about three hundred years,

the increase was much less than between the latter and that of Elizabeth, though only about two hundred years. But what is this to the rapidity of its progress in modern times when it has been found, according to the annexed synoptical view, to have more than doubled in England, between the years 1700 and 1821. There has been some increase throughout Europe, for Mr. Jacob, in his Tract on the Corn Laws, p. 148, has stated that according to a very accurate census kept of the population of Prussia, it had increased in that kingdom by 1,849,561, between the years 1817 and 1827, the total population in the year 1822, being 12,075,657. He found it considerably less in other parts of Europe, so as in some to be but just perceptible. So great however did the increase in England exceed what could be expected, when compared to other European States, that it excited great surprise among the continental students of Statistics, among whom this has been for some time past a very favourite study. Among others Sir Francis D'Ivernois of Geneva, one of the most ardent of them, wrote to Lord Bexley on the 29th of May, 1830, expressing his great doubts of the accuracy of the calculations. This letter was transmitted to Mr. Davies Gilbert, Chairman of a Committee of the House of Commons then sitting on the Population Bill, who transmitted it for explanation to Mr. Rickman, to whom had been confided the arrangements and

calculations of the several censuses, and of whose fidelity and ability no doubt could be entertained. He returned an answer which was quite satisfactory.

The next and most important subject of enquiry is, that of accounting for the superior progress of it in England above the other nations in Europe, Prussia perhaps excepted, and over all the nations of the known world, the United States of America excepted. If Political Economy deserves the name of a science, it ought to account for these very curious and highly interesting facts, and the sound and correct understanding of which is of the last importance to statesmen and legislators, as well as those engaged in the study of nature and the art of medicine. Those who employ themselves in these researches find great difficulties in eliciting satisfactory truths, not only from the darkness of history, but from the enquiry embracing not only that class of truths which belongs to the exact sciences, and the laws of nature, but is clogged with all those intricacies, exceptions and plausibilities connected with the passions, prejudices, and errors of a rational and moral being.

Deprecating then too harsh a criticism, let us find out if we can, in what the present age differs from that of the Norman Conquest ; of Edward III ; of Queen Elizabeth ; and of the 18th century. There is no where to be met with in history a more cruel and tyrannical government,

a greater disregard of the feelings, sufferings, and rights of the subjects than under the dominion of the early Norman kings ; in an age too of profound mental darkness in all that regarded those arts of life which minister to the production and fabrication of the articles constituting the necessities of life, the requisites of comfort and health. This state of oppression and ignorance continued to lose ground very slowly, for we learn from history that famines were very frequent, and that great misery prevailed, not only under the immediate successors of the Conqueror, but till nearly the end of the Plantagenet race of kings, every bad crop producing either a famine or a dearth approaching to it ; and there is reason to believe that two consecutive bad years were always followed by famine, as was experienced in the reign of Edward the Second. And these evils were greatly aggravated, not only by want of agricultural skill, but by pernicious laws and vulgar prejudices regarding the corn markets. Frequent famines therefore, and the frequent recurrence of various diseases, continued for near 400 years after the Conquest, the last famine in England having occurred in the year 1448. In this series of ages, along with great improvements in the arts of life and in the exercise of government, there gradually took place great alleviation of physical misery, by the less frequent recurrence of pestilence and other epidemic maladies. In

illustration of the supply of food subsequently to this period, several circumstances are remarkable. 1st, that the use of animal food was more general than the produce of agriculture. 2ndly, there appears to have been no famine; nor was there any remarkable dearth during the civil war either of the Princes of the houses of York and Lancaster, nor of the King and Parliament. 3rdly, the occurrence of famine would have been still more frequent in the early periods of our history here alluded to, had the main stock of subsistence consisted in corn, for the stores of animal food are less dependant on the seasons than the crops. The great dependance on animal food, however, was, no doubt, one reason for the low state of the population, for cattle required a large extent of natural herbage to maintain them. A large share of farinaceous food must nevertheless have entered into the general mass of subsistence, otherwise bad years would not have been productive of so much distress. In process of time, as civilization advanced, so did agriculture; yet as late as Henry VIII. we find that the price of beef, veal, and pork, being considered the food of the poor, was limited to the price of one penny for two pounds, or two pounds and a half, at a time when wheat was sold for seven shillings and eight-pence the quarter; so that animal food was only at one-twentieth, while wheat was about one-tenth, of the present

prices. Nay, in the 17th century, wheat bore a much higher ratio to animal food than in our times, for it appears by the Eton tables, so often referred to by authors, that the former bore a higher price during the whole of that century than it did for forty years preceding the year 1773, whereas butchers' meat bore only half the price in the former period of what it did in the latter. Previous to the 18th century, therefore, it appears that animal food constituted the chief sustenance of the labouring poor ; and it ought to be remarked, that wheat, which is now their principal food, was then little used but by the upper ranks. Oats and rye, even in the southern parts of England, were then the most common farinaceous articles in use. As civilization advanced, and agriculture improved, the proportion of animal food became again greater, for the raising of food for cattle, which formerly consisted solely of natural pasture, has become a great branch of agriculture, not only through the improvement of pasture by tillage, but by the cultivation of hay, turnips, carrots, cabbages, and potatoes. Some of these articles, now the common food of cattle, were, two hundred years ago, considered as delicacies for the human species. Even the practice of storing hay for winter provender was not in use till after the middle of the 17th century ; for in the reign of Charles II. it was customary to live upon salted meat in the

winter months; and we learn from Dr. Willis, and other writers, that in these months the sea scurvy was a frequent complaint in this metropolis.

Much more might be said on this subject, but though I have stated in setting out that the discussion of this part of it would be greatly enlarged, I find that in entering more minutely into its ramifications, I might with good reason incur the censure of my professional readers, by departing from its professional purpose, and making it a work of amusement and general science, foreign to its purpose. Those who may desire to follow up these researches, will find them discussed at greater length in a Tract I lately published, entitled, *Reflections on the Present Crisis of Public Affairs, with an Enquiry into the Causes of the existing Clamours and Grievances.*—But I shall now proceed to matter more closely connected with the intention of this Work.

In comparing this country with itself, chronologically, there has appeared in what has already been stated, in the several epochas of our history, viz. the Norman Conquest, the age of Edward III. that of Queen Elizabeth, that of the 17th and 18th century and the beginning of the present century, sufficiently palpable and well ascertained causes of our superiority in all the materials of health and comfort. The inferior

condition of the population at the Conquest and for two or three hundred years after, consists in the cruel civil oppressions in the early part of that series of ages, and though in succeeding eras there was a gradual mitigation of this evil, there remained a like degree of scantiness in the supply of the necessaries of life, these being inferior to those of our own time both in quantity and quality, bad clothing, also, bad habitation, a frequent recurrence of famines, leprosy, sweating-sickness and pestilence, to which may be added, the scanty though melancholy records we have of the frequent recurrence of putrid fevers, small pox, &c. some of which, such as the sweating sickness and leprosy, have disappeared, the small-pox nearly so, also the sea scurvy which used to break out in the winter season. To the causes consisting in the deficiency of food and shelter, there ought to be added the want of personal cleanliness. Linen was but little used, and soap was almost unknown till the 17th century.—The agues also which constituted so large a proportion of the diseases in the bills of mortality have now disappeared in consequence of the cleanness and dryness of our streets, and the like may be said of the rest of England, in consequence of the draining practised as an agricultural improvement, which has confined agues to a few undrainable districts, such as Cambridgeshire, Essex, and Lincolnshire. These advantages do much more than compensate for

the disadvantages arising from the less healthy occupation of manufacturers, though they appear by the censuses to have been greatly exaggerated. The extinction of the sea scurvy is peculiarly deserving of notice, by the incredible advantage it has ensured to the Navy, as has been stated in the first Dissertation.

In short, it may with truth be affirmed, that however inferior England may be to many other countries in mildness of climate and fertility of soil, apparently so adverse to health and comfort, this is more than compensated by those strenuous exertions of mind and body which have conferred on her that superiority of character which distinguishes the inhabitants of this island, as well as that pre-eminent power, prosperity, and happiness which they enjoy.

The four great necessities of life are food, clothing, shelter, and fuel ; and it is to the skill and labour which the climate of England renders indispensable for the procuring the three first of these, that those habits of industry and hardihood are acquired which are equally conducive to virtue, intelligence, and health. It is truly said, that under all the disadvantages and vicissitudes of our rains, fogs, and frosts, there are more days in the year in which a person can go abroad with satisfaction and comfort, than in the south of Europe, where the atmospheric heat confines people to the house, the greater part of the day,

for a great part of the year, while we are in the full enjoyment of the healthful delights of the open air, and even disregard the fervour of the sun-beams from which the indigenous population shrink. Nor do we find ourselves under the necessity, like the Russians, to contrive such a system of guarding against cold in winter, as to induce habits of tenderness and effeminacy even among the lowest ranks. In the year 1797, a squadron of Russian ships of war wintered in our ports, and having become sickly, the writer visited them officially in order to make arrangements for their treatment and accommodation. He found that their unhealthy state proceeded chiefly from cold, and that their extremities were frost-bitten, that is, fell into torpidity and gangrene, from a degree of cold from which the British seamen felt no inconvenience. Had they been in their own country at this season, they would have been out of the reach of cold, in close and warm habitations under ground. It was remarked also, in the severe winter campaign of 1813-14, that of the native French, Austrians, Prussians, and Russians, the last-named suffered most.

What an ascendant, then, do the natives of the British isles, as a military nation, possess over their neighbours and rivals in the north and south, in being able thus to endure the extremes of heat and cold better than the natives themselves of those respective countries, as has been histori-

cally and practically proved ! For, is it not, ascribable to this that we have outstripped our antagonists in the race of arts and arms in all climates, pushing the pursuits of war, commerce, and science, in the wide range of the five zones, to the utmost verge of the habitable earth, and the navigable ocean ?

The first, and principal class of the necessities of life above enumerated is food, the sources of which are pasturage, agriculture, horticulture, and fisheries. In an economical and political, as well as medical view, the several species of it may aptly be classed under three heads ; the animal, consisting of land and water animals ; the farinaceous, consisting of the grains, potatoes, and some other roots ; and the production of the garden, consisting of roots, fruits, and greens.

It is providentially ordained that the chief subsistence of this and other civilised nations should consist of the productions of agriculture, for this branch of industry is of all other employments, the most conducive to virtue and health, and the productions themselves are, of all others, the most salutary.

A valuable accession has been made to our stock of farinaceous food in the last hundred years by the introduction of potatoes. In the degree in which they have been cultivated in Great Britain, there can be no doubt of their having added to the substantial comfort of the people, and even

to their numbers. But in a sister kingdom, as already remarked, it is to their operation, as the main constituent of national sustenance, that her population has advanced from little more than one million to near seven millions in the last hundred and fifty years. With all this advantage serious objections have been raised to this species of food, in comparison and contrast with that of the grains. It is alleged, first, That the cultivation of this salutary and nutritious root demands so small a portion of time and labour in comparison of the grains, that a habit of sloth is engendered incompatible with happiness, dignity, and virtue, so as to make an approach to the evils of spontaneous food; Secondly, That this great facility of procuring adequate food, so far outruns the acquirement of other necessities of life, clothing, fuel, and shelter, as to leave the people in the depth of degradation and misery;* Thirdly, It is alleged that this species of food differs from the grains in this important respect; that it is of so perishable a nature, that it hardly extends round the year, and far less can the abundance of one year be brought in aid of the deficiency of a following year, in which a mortal scarcity may

* There is an exception to this in the province of Ulster, where the profits of manufacturing industry enable the peasants to purchase the means of subsistence from distant parts when it fails among themselves. Corn is also more cultivated in the North-eastern district than in the rest of the kingdom.

occur from the failure of a crop. Lastly, That the whole of these allegations are practically and deplorably proved by the physical and moral evils which so frequently and lamentably prevail in Ireland, particularly in the south-west districts of that kingdom, in the shape of famine, conflagration, and murder, no abatement of which has occurred since the emancipation of the Catholics, as the adherents of that religion promised.

Though this article of subsistence, therefore, has proved an incomparable benefit to England, she will act wisely in continuing to use it to a limited amount, by employing it as an invaluable auxiliary and substitute, but by no means as a staple article, far less as an exclusive constituent of national subsistence. There is not however the same risk of this here as in Ireland, potatoes not having been introduced into England till an age of high civilization.

It has been said, that in a medical, as well as in a practical and economical view, farinaceous nourishment is pre-eminent over the other classes. In the regulation of diet for the sick, animal matter is too highly alimentary, stimulant, and putrescent, and the *olera*, as well as the greater number of roots and fruits are flatulent, acedcent, of more difficult assimilation, and too low in the scale of nutrition.

It has been already remarked that if there should, in years of ordinary plenty, be just enough,

and no more, produced, than what will sustain life, every year of scarcity must prove a year of famine. In simple ages, there are no motives for producing more than what the wants of nature require. But as refinement and the arts of life advance, a demand arises for horses, fermented liquors, and the various artificial wants of luxury. These operate virtually as a perpetual granary, so that when a year of scarcity arises, the resources of superfluity may be turned into the channels of necessity. To this, and the free commerce of grain, both foreign and domestic, we owe our long exemption from famine in England.

But the writer ought to remember how much he is still trespassing on the time and patience of his reader, and will cut short this part of the subject, by a close comparison of the health and longevity of periods so recent as those of William III. and George III. This comparison has the great merit of being grounded on principles which do not admit of a possibility of error in their application or results. It is built on a comparison of two similar financial operations of life annuities, one in the year 1693, the other in the year 1789. The evidence is that of mathematical demonstration, and the facts are of unquestionable accuracy, the ages and lives being recorded in the Exchequer. They are exhibited in the following Table, the fidelity and exactness of which will not be doubted, when the reader is informed

that the Author is indebted for it to Mr. Finlaison, one of the most able calculators of this age, and is part of a series of labours in which he is assiduously engaged for the general benefit of society, as well as of the English Government.

A Table exhibiting the law of mortality in two different periods :

Age.	Mean duration of life, reckoning from		So that the increase of vitality is in the ratio of 100 to
	1693	1789	
5	40.737	51.580	126
10	38.066	48.310	126
20	31.799	41.190	130
30	27.625	35.370	128
40	22.697	29.070	128
50	17.316	22.325	129
60	12.451	15.855	127
70	7.489	10.100	135

It is mentioned in the Annual Register, 1761, p. 178, that “ It appears from an ancient register which may be depended on, that of 100 persons born at the same time, there were alive at the end of 6 years, 64 ; at 16 years, 46 ; at 26 years, 26 ; at 36 years, 16 ; at 46 years, 10 ; at 56 years, 6 ; at 66 years, 3 ; at 76 years, 1.” It is not said in

what age this was, but whoever will cast his eye on the foregoing Table will perceive with mingled surprise and satisfaction the highly improved value of life in the age in which we live. The persons, upon whom the calculation is made, are, no doubt, select lives, taken from the middle ranks of society ; yet as they are similar cases, the comparison must be admitted to be fair. But a like improvement in health and duration of life in society at large, is deducible from the comparison of the *censuses*. The statement, as exhibited above, would not indeed be credible, if it did not rest on demonstrated conclusions, and not on those probabilities, conjectures, vague analogies, loose and questionable inferences with which the ordinary reasonings in political economy so much abound. Without such well-founded assurance, who could believe that human health and longevity are so superior, in the present age, to that immediately preceding it, as to afford the chance of nearly one-third more of earthly existence? And can it be doubted for a moment that all those means which add length to life, add also to its substantial happiness, respectability, and virtue. Various causes for this great change have been assigned, but it is hardly conceivable that they could have operated with such powerful effect. And while this is consolatory to society at large, it is flattering and encouraging to those who have lent their best endeavours to ameliorate the

condition of humanity, and who have met with their best reward in the success of their endeavours. The causes appear chiefly referable to the more ample supply and better quality of food, better clothing, and more fuel, better habitations, improved habits of cleanliness and ventilation in persons and houses ; greater sobriety, and improved medical practice. Whether these causes operate with a relative degree of effect corresponding to the order in which they here stand, or any other order, must be matter of opinion ; but if health and long life are to be admitted as the surest criterions and constituent elements of human happiness, it would appear that we have much reason for self-congratulation in having had our lot cast in this age and country.

I shall conclude this Dissertation with a more detailed narrative of progressive health in England in different ages, and its unequal prevalence in different districts.

In the slowly progressive amelioration of the state of society in England, we were more than two hundred years later in getting rid of pestilence than of famine. Though these two calamities are frequently combined, they have also frequently occurred separately. The plague was most frequent, universal, and destructive in the middle of the fourteenth century. It spread from the north-western parts of Asia over all Europe, and reached England in all its horrors in 1349. The whole of

the kingdom was infected. In some parts, two-thirds, or more, of the inhabitants were carried off, but, on an average, one-half was computed to have perished ; and it was equally calamitous all over Europe. There are sufficient proofs of it having been imported in the 17th century, chiefly from Holland,* though it has been thought by some to have been engendered by squalid habits of life, combined with scanty and bad food, for it always made its first appearance among the poor. But the more natural explanation of this is, that the noxious effluvia generated by these habits, and the weakness of body and depression of mind induced by the scanty quantity and bad quality of food, creates a predisposition or susceptibility to noxious impressions. There can be little or no doubt, that in the immensely multiplied degree of commerce in this age, the infectious matter of plague has been imported by sea to London from the Levant, but that the spark has failed to light up the flame of pestilence as formerly, for want of the requisite fuel.

It has been explained in my Dissertation on the Health of London, how much health has been encreased by the improvements in clothing, habi-

* There is no wonder that this should happen to London, from the close commercial intercourse with Holland in that age, but there is evidence of its having been imported into the west of Scotland by a bale of dye stuffs sent from Holland to Ayr.

tation, and fuel. It appears that in very rude, and almost savage times, the diseases arising from want of cleanliness and ventilation were less prevalent, than in what may be called the semi-barbarous ages. In the former, the modes of life are so simple, as not to exclude fresh air, nor to harbour that filth on persons and in habitations which produce typhus and dysentery, and which invites the plague. In the progress of civilization and refinement, this is obviated by a taste for cleanliness and decency. It is remarked by Dr. Macculloch, in his account of the Hebrides, that while the inhabitants had no shelter but huts of the most simple construction, which afforded free ingress and egress to the air, they were not subject to fevers ; but when, through the good intentions of the proprietors, such habitations were provided as seemed more comfortable and commodious, but which afforded lodgement for stagnating air and impurities, which they had not the means, or wanted the taste for cleanliness to remedy, then febrile infection was generated. It is deducible from this, that however important personal cleanliness may be, ventilation is more so. To the same purpose we might quote an analogous remark made by Dr. Robertson, regarding the moral habits of the European nations in the middle ages.* It was no doubt owing to improvements

* See a Preliminary Discourse to the History of Charles V., ch. v. sect. 1.

in the modes of life, particularly in respect to ventilation, that the plague of 1665 did not become epidemic beyond the metropolis as in the 14th century, nor did it affect the upper classes of society.*

There are records of some severe epidemics besides the plague in past ages in England. The sweating sickness has already been mentioned; and also the severe epidemic of 1558; but it may be farther remarked, that this last spread all over England, and seemed to be connected with the weather, for it was a year of great floods, affecting the harvest, which was rendered still more scanty by the want of hands to gather it in, on account of the sickness and mortality. Dr. Short, in his *Comparative History*, mentions, that this intermittent fever was attended in many cases with a dysentery.

The observations relating to the salubrity of different districts of England, are taken from the

* See Lord Clarendon's *Life*, written by himself.—There is historical proof of the plague having been twenty times epidemic in London, from the year 1572 to 1665. In the plague of Geneva in 1615, out of 4,000 who died of it only four belonged to the class of rich citizens—in a population of 13,000. See *Voyage en Suisse*, by M. Simon; a fact strongly demonstrative of the power of hard labour, filth, and scanty food, in creating a pre-disposition favourable to the catching of infection. This was the last time the plague appeared in Geneva, though it had occurred six times from the year 1530 to this time, another proof of the virtue of improved ventilation, and habits of life.

Parliamentary returns of 1811. The counties in which the mortality was above the average, were Middlesex, where it was 1 in 36 ; Kent, where it was one in 41 ; Warwickshire, where it was 1 in 42 ; Cambridgeshire, where it was 1 in 44 ; Essex, where it was also 1 in 44 ; Surrey, where it was 1 in 45 ; the East Riding of Yorkshire, where it was 1 in 47 ; Lancashire, where it was 1 in 48. Of these eight counties, four are subject to agues, namely, Kent, Essex, Cambridgeshire, and the East Riding of Yorkshire, comprising all the counties of that description, except Lincolnshire, in which the mortality was below the average, for it was then 1 in 51, the average being 1 in 48.7. The smaller degree of mortality in this last, is no doubt owing to the great proportion, which the dry and upland part of this county bears to the fenny districts. That there is a great difference in the mortality in these, is proved by their respective returns. The mortality in the town of Boston, for instance, which is situated in the fens, is 1 in 27 ; whereas that of Stamford, which is in the dry and upland division, is 1 in 50.

And here it may be proper to advert to an observation, grounded on a very satisfactory induction of facts, in a tract lately published, of which Dr. Wells is the author,* that Phthisis Pulmo-

* This tract is an article in the third vol. of a work, entitled Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge. London, 1812.

nalis is but little known in those districts which are infested with the exhalations producing intermittent fevers. But as this disorder forms one of the principal heads in the general mortality of England, so much the more is to be imputed to intermittents, in those districts in which they are endemic.

It may be asked, whence arises the greater mortality of the other four counties, of which the rate is above the average. With regard to Middlesex, it is imputable no doubt to the various circumstances adverse to health, peculiar to the metropolis, such as the more intemperate habits of life, and perhaps still more the unfavourable influence of the air of this great city, particularly on young children. It is worthy of remark, however, that London has of late years been improving in salubrity; for it appears by the bills of mortality, that the burials invariably and considerably exceeded the christenings, till a few years before the close of the last century: whereas since that time the christenings have generally exceeded the burials. This may in part be ascribed to vaccination; but it cannot be entirely owing to this cause, for the decrease of burials took place some years before that admirable discovery. The first year on the records of the bills of mortality, in which the births exceeded the burials in this metropolis was 1790. The great diminution of mortality among young children, so as to

amount now to little more than one-half of what it was as late as the middle of last century, has been already adverted to. In farther proof of the improving health of London, it is stated in this Parliamentary Report, that the annual mortality in 1700, was 1 in 25 ; in 1750, 1 in 21 ; in 1801, and the four preceding years, 1 in 35 ; and in 1811, 1 in 38. The increased mortality in the middle of last century, has been imputed to the great abuse of spirituous liquors, which was checked about that time by the imposition of high duties. The other causes of superior health, seem to consist in a general improvement in the habits of life, particularly with regard to ventilation and cleanliness,* a more ample supply of water, particularly since the new water companies began to supply the town, greater abundance, and better quality of food, the improved state of medicine, and the better management of children.

The high proportion of mortality in Surrey is no doubt owing to its containing a portion of the metropolis, consisting of a population of 170,000, which is more than one-half of the whole county.

The high rate of mortality in Warwickshire, seems at first sight the most difficult to be

* It ought to be remarked, that the bad effects of deficient ventilation and cleanliness are not confined to the immediate subject of them, but extends to the whole community, for the typhous virus thereby generated, affects all conditions of people.

accounted for, the air of this part of the kingdom being very salubrious. It is no doubt owing to the town of Birmingham being situated here, for it comprises two-fifths of the population ; and the mortality, on the average of the last ten years, is 1 in 34. The mortality in this town is greater than in Manchester, Leeds, or Norwich. The operations in metals* have been alleged as the cause of this ; but it is more probably owing to the want of cleanliness and ventilation, particularly with regard to the streets, which are said to be very narrow and dirty.

With regard to Lancashire, where the mortality is somewhat above the average, the number of large towns and extensive manufactures, affording a greater proportion of artizans to rural inhabitants, than in any other county, except those in which the metropolis is situated, is certainly the cause of this, for the air is very salubrious, and the great quantity and cheapness of fuel is extremely friendly to life, health, and comfort. It is probably owing to this advantage, that the inhabitants of this county, particularly the females, have become noted for their well-formed persons and comely countenances, forming a contrast with those of Buckinghamshire, where the fuel was extremely scanty and high-priced before the late extension of the inland navigation, so that the labouring class suffered peculiar hardship

* See Ramazini de Morbis artificum.

from this privation, and are of a stature so inferior to that of other counties, that the Militia-men are, by Act of Parliament, admitted at a lower standard than the rest of England. The report of Manchester, which is the second town in England in point of population, forms an exception to the rest of Lancashire, for the mortality there on the average of the last ten years, was 1 in 58, and in the year 1811, 1 in 74. But that of Liverpool was 1 in 34 on the average of ten years, and 1 in 30, in the year 1811. In the former we have another pleasing picture of the progressive improvement of health, for it is stated by the late Dr. Percival, that in the year 1757, the annual mortality of Manchester was 1 in 25.7, and in 1770, 1 in 28; although at the former period the population was not quite one-fourth, and at the latter period, not one-half of its present amount.* This improvement of health is clearly imputable to certain regulations of police, particularly with respect to ventilation, recommended and introduced by the above-mentioned benevolent, enlightened, and active physician. Since that time much praise is due to Dr. Ferriar, who followed the footsteps of Dr. Percival.

The like progressive amelioration of health, is deducible from these public documents with respect to the whole kingdom, as already stated.

* See the Works of Dr. Thomas Percival, vol. ii. Warrington, 1789.

This statement of facts, coupled with the general result of the population returns, together with the annual increase of wholesome subsistence from the rapid extension of agriculture, may be fairly deemed a proof of the increasing happiness, power, and prosperity of this country, and cannot fail to afford the most solid satisfaction and delight, to every benevolent and patriotic mind, notwithstanding the present distressed state of land proprietors and cultivators, which, it is to be hoped, will prove temporary.

I shall conclude this Dissertation with a few remarks on the progress of population, which except where it exceeds the limits of food and employment, as in China and Ireland, and perhaps in England at this time, as far as regards employment, may be taken as one of the fairest criterions of the health, wealth, and general prosperity of a nation.

The historical materials on this subject in the early history of England are so scanty, as to leave too much room for conjecture. I am informed by Mr. Rickman, whose superior competency to judge of such subjects must be undeniable to those, who know that it is he who has, with so much industry and sagacity, digested and commented on the three decennial censuses which have been taken of Great Britain, that according to the best inferences which can be deduced from Domesday Book, the population of

England in the time of William the Conqueror was about one-sixth of what it was at the enumeration of 1811. By this calculation it would be 1,589, 609.

The next era at which we find any *data* on which to found an approximate conclusion on this subject, is in the reign of Edward III. A. D. 1377, when a poll-tax of fourpence was imposed on all persons of both sexes above the age of fourteen.* The taxable persons were found to amount to 1,405,602. The number under this age, by some of the best constructed tables, is one-third of the whole population, which would therefore be 2,108,403, and stating one-fifth of the taxable subjects as the probable number of those who would elude the tax, would be 2,635,503.

The next historical incident which throws any light on this subject, is the general muster of fighting men, made on occasion of the threatened invasion by the Spaniards in the reign of Queen Elizabeth. This list amounted to 1,172,000, on the authority of Sir Walter Raleigh, in his Essay on Shipping. The proportion of fighting men to a whole population is computed to be from one in four to one in five, but as the public zeal at that time in repelling the meditated aggression of the

* See this adverted to in Sir Richard Worsley's History of the Isle of Wight, page 10.

enemy would make great numbers forward to enroll themselves we may safely take it at one in four, which will make the total of men, women, and children, somewhat more than four millions and a half at that crisis. This was an encrease of more than two millions above the age of Edward III. a space of 200 years, whereas the encrease from the Conquest to Edward III. a space of 300 years, was little more than one million. This might naturally be expected from the oppressive government of the first Norman kings, and devastating wars and pestilences under Edward III.

Mr. Rickman, on a computation founded on the return of baptisms, as stated in the abstract of parish registers, makes the population of 1700 amount to 5,475,000, that of 1750 to 6,467,000, that of 1770 to 7,428,000.

The first actual enumeration was made in 1801, suggested by the two preceding years of scarcity. This gave to England and Wales 9,168,000, and a mortality of 204,434, that is, 1 in 44.8 of the year in which it was taken.

That of 1811 gave a population of 10,488,000, and a mortality of 208,184, that is 1 in 48.7 in the year in which it was taken. There was therefore an increase of population in these ten years of 1,227,635, and a diminution of mortality in the inverse ratio of 44.8 to 48.7. The average mortality of the twenty years computed in the censuses was 1 in 50. It may here be remarked,

that from the nature of the thing, errors of *defect* are much more likely to occur than errors of *excess*, particularly in the first enumeration, both because the methods of collecting the numbers were less perfect, from want of experience, and from a jealousy of its being intended for some purpose of taxation, or military levy. This error would be in some measure compensated by a like error in the burials.

The enumeration of 1821, has given a population of 11,977,663, being an increase over the last of 1,828,048, a number more than equal to the whole population of England, exclusive of Wales, at the Norman Conquest, and greater than that of England, probably exclusive of Wales, three hundred years afterwards, as already stated. As the returns of 1821 have not yet (June 1822) been finally digested, the mortality of the last *decennium* has not yet been printed, but it is expected not to exceed 1 in 57.*

The present population of England, therefore, is more than seven times what it was from the eleventh to the fourteenth century, three times what it was towards the end of the sixteenth century, has more than doubled itself since the last year of the seventeenth century, and nearly doubled itself in the last seventy years.

* In this 2nd edition of the Work we are enabled to calculate the mortality of 1820, the tables having been filled up; and it turns out to be 1 in 57.4, that is a diminution of about 9 per cent.

It is a matter of the deepest moment to those who are in the habit of meditating on the fluctuations and unequal distribution of public prosperity and national happiness in this or other countries, to consider by what means the subsistence of the people of England has kept pace with their numbers. It is also singularly interesting and curious to reflect on the accelerating rapidity of this increase in the late, and still more in the present generation, and pleasing to remark, that there has been less distress from deficiency of food in this period than in any other of equal duration in any part of our history. It is self-evident, that the supply of subsistence, from whatever sources it may have flowed, must have kept pace with the progressive population, and it appears that it has done so with a degree of abundance and regularity unknown in former ages. The main source must have been domestic production, for imported food, even when at the highest, has constituted but a small proportion of the total stock of subsistence. This increase of production has been effected by the extension and improved skill in agriculture, as applied to the cultivation of bread-corn for the food of man, of pasture and provender for that of cattle, and the introduction of potatoes for the sustenance of both. But notwithstanding these augmented resources, this country, which had formerly great quantities of corn to spare for exportation, en-

creased so rapidly in population in the middle of the last century, that exportation ceased about the year 1766, and importation became necessary for the demands of internal consumption. This was particularly conspicuous in the two consecutive years of scarcity, which terminated the last century, during which twelve millions sterling was said to have been expended on foreign corn. From the stimulus given by high prices on this occasion, agriculture was carried on with all that spirit or rage,* as it has been called, of speculation

* Though the additional land brought into cultivation by the division of commons does not comprise the whole amount of the late additional productions of agriculture, a recital of the increased number of enclosure bills, at different periods, will be no bad index of the growing spirit and extension of agriculture. There were none before Queen Anne, in whose reign, of twelve years, there were three ; in that of George I. of fourteen years, there were sixteen ; in that of George II. of thirty-three years, there were one hundred and forty four ; in that of George III., of sixty years, 5058 ! making an annual average of eighty-four in the late reign. But that portion of it in which the greatest number of these bills passed was the first fifteen years of this century, during which they amounted to 1420, making an annual average of ninety-four, exclusive of fractions. The number of these bills has rapidly declined ever since ; for, the whole number from 1816 to 1821, both included, has been only 301, that is an annual average of fifty. Some idea may also be formed of the encrease of agricultural industry, from the superior proportion which the agricultural population bore to that employed in trades, manufactures, and handicraft, in 1811, compared to 1801. By the returns of 1801, the rural population exceeded

which was thought to belong only to manufactures and commerce. With so much vigor and success has this been done, that the productions of husbandry have been raised to such an enormous amount as, even under an increasing population, not only to supersede foreign importation, but to render it an indispensable matter of policy to exclude it. This was done by the corn bill of 1815. Even this has not saved the agricultural classes from that deep distress which had overtaken them in 1814. This, however, is not imputable entirely to the exuberant, domestic production of corn : for, ever since the year 1806, the importation from Ireland has been rapidly increasing so as materially to interfere with the English markets. The increased consumption of potatoes since the two years of scarcity cannot fail to have had a like influence on the price of corn.

The only important remark in addition to what has been said is, that the low price of imported corn (thirty-five shillings the quarter) having been alleged as the main motive for the passing of the corn bill, and a prohibitive duty having been judged necessary for the protection of the

the trades by one-sixth ; but by those of 1811, by one-fourth, as any one may satisfy himself by consulting the abstract of the population at these two periods. But the classification of the first period was so inaccurate, that much dependance cannot be placed on it : so that the difference of the two classes in the two censuses was probably not so great as here stated.

English landlord and farmer, a London mob resented it, as the means of raising the price of bread, and pulled down the house of the mover* of the bill, which made it be abandoned for that session (1814) but it was passed the following year. Suspicions having nevertheless arisen that foreign corn could not at all times be found sufficient to supply the deficiency of domestic production, Mr. Jacob was sent on a mission to examine into this, and, in a tour which he made in the agricultural countries, he actually found that their surplus production was so precarious that no dependance could be placed on it. The natural inference from which is, that the corn bill could not in point of good policy be sustained.

* Mr. Frederick Robinson, created Viscount Goderich, in 1827.

DISSERTATION VI.

On Infection.

Since the preceding edition of this Work was submitted to the Public nine years ago, several Tracts on the subject of Infection have appeared. Some of these have thrown a beneficial light on it ; but with regard to others, it is deeply mortifying to reflect how little the Authors of them seem to have been aware of that grave and sacred attention which is due to the cause of truth, in matters of the highest moment to some of the most dear and tender interests of humanity. Nor do these authors seem to have been aware of the difficulty of a question, to the discussion of which, we ought to come armed with that caution, candour, modesty, and correct reasoning, which are required in a subject in its nature so singularly complicated, and in importance inferior to none.

At the head of these pernicious and ill digested works stands one, entitled “ The Evils of Quarantine,” of which little more need be said than that it is a repetition of a doctrine, the main object of which was to inculcate the belief of the plague not being an infectious disease. By similar pro-

cesses of spurious reasoning, the exemption from infection has been attempted to be established with regard to other epidemic diseases, by the wide spread of which the human species has been most calamitously affected in modern times. Though these writings do not perhaps carry with them the same glaring absurdity and sophistry, as those concerning the plague, they have been infinitely more mischievous, by their greater plausibility and popularity, and as they respect diseases which have taken a wider range among the nations of the earth than the plague itself. The reader will readily conjecture, that the diseases here alluded to are the Yellow Fever and the Indian Cholera, of which more ample notice will be taken in the subsequent details of this Work. The present Article is devoted to the general history of Infection, and the distinctive features and characteristics of its various species, which are more complicated, and therefore more inscrutable, than perhaps any other department of natural research; and demanding of those who engage in it a pious aspiration after the assistance of that power which can alone endow us with a due spirit of candour, good temper, self-diffidence, and a mutual allowance for a liability to error on the part of those who honestly differ from each other in opinion.

It may be natural for the reader to ask on what I consider the term Infection to differ from

Contagion, or whether they are here deemed synonymous. After duly considering the subject, the author thinks it will be an avoidance of idle controversy to employ them as synonymous. They both imply some species or other of morbid matter; but as Contagion, by its etymology, seems to apply only to that which is communicated by *contact*, we prefer Infection, which embraces both this and other species of morbid matter, consisting of volatile particles, communicable at any distance. Infinite divisibility is predicable of both in common with other matter, which accounts for the almost incredible subtlety of their communication. And as it is of primary importance in all controversial questions to settle the import of words, the author thinks it incumbent on himself, and all others who handle this subject, to keep in constant remembrance the broad distinction between those morbid exhalations which proceed from living animal bodies, and those which proceed from the surface of the earth, of which the most strongly marked are those which cause agues or intermittent fevers. This is so clear a distinction that it could hardly be suspected that the confounding of them together could have given rise to any ambiguity, particularly as the diseases arising from them may be so distinctly marked by the two terms *epidemic* and *endemic*; the one being applied to diseases originating in the animal poisons, such as plague and small-pox;

the other, to those proceeding from the exhalations of the soil, namely, agues. Yet, notwithstanding this lucid discrimination, authors, even respectable authors, have been betrayed into the most idle and verbose disquisitions by forgetting it.

The author having thus cleared the ground in so far as regards the import of *words*, his first remark as regards their *nature* is, that the essential attribute of all infections is so obscure and inscrutable, that he must assume it as an ultimate and inexplicable fact ; for how and why a secretion or exhalation proceeding from the whole or part of a diseased body, should excite the like action in the whole or the corresponding parts of another living body, seem to be problems beyond the reach of the human mind to resolve. With regard to its production, it seems to bear some analogy to the healthy functions of digestion and secretion, whereby assimilations peculiar to life are effected. With regard to its final cause, it would be still more presumptuous to pronounce. As infections are generated and propagated by offences against bodily and mental purity, may not the resulting diseases be considered as so many sanctions instituted by Providence for the chastisement of human depravity ; or are we to consider them according to the theory of an eminent author, as one of the means provided for keeping down the rate of population to that

of subsistence. This is a question in which we feel no inclination to enter, the utility of studying or deciding upon it not being very obvious, and the relief of human sufferings being the only object here in view.

And with this view let us patiently and diligently, in accordance with those virtues above recommended as becoming the medical character, and as the only sure antidote to that arrogance and pertinacity of opinion, which are so unsuitable to the dignity of a liberal profession, and a cultivated mind. That these sentiments stood foremost in the mind of Hippocrates, as a primary principle in the study of medicine, is evinced in the first sentence of his aphorisms,* a sentence as compendious, comprehensive, profound, and instructive as was ever penned : and as no time can render it obsolete, so no frequency of quotation can render it stale, trite, or impertinent. The *experientia fallax*, and *judicium difficile*, are particularly applicable to all medical subjects. Another great name in physick, Baron Haller, seems to have had the like sentiments uppermost in his mind, for in the most elementary of all his works, entitled the *Outlines of Physiology*, he evinces, *in ipso limine*, in the very title page, how deeply his

* ὁ βίος βραχύς. ἡ δὲ τέχνη μακρὴ. ὁ δὲ καιρὸς ὀξύς. ἡ δὲ πείρα σφαλερή. ἡ δὲ κρίσις χαλεπή. Vita brevis, ars longa, occasio præceps, experientia fallax, judicium difficile.

mind was impressed with them, by choosing for a vignette, the Mariner's Compass, with the motto *fidem non derogat error*. The application of this to the study of medicine is pertinent and ingenious, and at the same time encouraging, for amidst all the seductions of error with which the pursuit of knowledge, in the science of life and health is beset, we are exhorted by this not to be disheartened, nor to fall into sceptical indolence and despair, because we have no short and unerring road to truth ; just as if a navigator, in shaping his course through the trackless ocean, were to undervalue and throw aside the mariner's compass, because of the variations of the magnetic needle, by its seemingly capricious deviation from the axis of the earth.

It might appear at first sight that infection might be defined a matter generated by disease, and communicating the like disease to other living creatures, generally of the same species, who either come in contact with it, or inhale it. But such is its anomalous nature, as before stated, that this will not in strictness apply, for it has been found that some infections, such as the hydrophobia, pass from one species of animal to another ; and with regard to what is called typhous and jail fevers, that is, those which proceed from the long stagnated and accumulated effluvia of the living human body, from deficient ventilation, squalid clothing, and crowding,

favoured by hardships and privations; the persons who are the subjects of this bad and miserable condition, have been found in innumerable instances not to be affected with the fever themselves, though they communicate it to others. This is a most useful piece of knowledge, and indispensable for those to possess who superintend the public police. In order to give weight and authenticity to this very useful branch of science, I shall here transcribe a few out of many instances on record of the calamitous effects of over crowding and filth in jails, and other receptacles of poverty and vice, contrasting the times of our immediate ancestors with the present; and there can be no doubt that prior to the civilized ages in which these instances are recorded, there must have been a still greater prevalence of these evils in ages more remote, but too ignorant to have them recorded. This infection, which may be designated the *typhous*, is distinguished from those called specific contagions in this respect, that it is capable of being generated by neglect, and a given combination of circumstances, in all ages; whereas the others, the small-pox for instance, is confined to a single uncreatable species of matter. The cases to be adduced here are chiefly extracted from Stowe's and Baker's Chronicles, authors who lived in the times of Henry VIII. and Queen Elizabeth.

“ At the assizes held at Oxford on the 4th, 5th,

and 6th of July in the year 1577, there arose such a damp from the prisoners tried, that almost all present were 'smothered,' in number three hundred, including the judges and jury. In the same circuit two hundred died at other places in the month of August, after which no more died. They did not communicate the disease to others, nor did any woman or child die, nor were the prisoners themselves affected with the fever. A fabulous and malignant story was propagated of one of the condemned prisoners having produced it by a wick dipped in a poisonous substance, which being lighted, caused the disease." "In the year 1583, at the assizes held in March at Exeter, twelve of the judges and jury, and many others present, died. This infection was introduced by Portuguese prisoners taken in contraband trade, who were in circumstances of the utmost filth, stench, and misery, and they infected the other prisoners. The fever in this instance spread to the inhabitants of the town." This difference was probably owing to the one town being more cleanly than the other.

The like cases have occurred, though much less frequently in later times. Some cases of the like kind occurred in the 16th century, in which the great Chancellor Bacon was called to decide, a doubt having arisen whether this mortal disease was not occasioned by subterraneous exhalations. He, as might be expected from his peculiar saga-

city, decided for the first time, that it proceeded from crowding and filth, an opinion which it appears had not been before entertained, and upon which humanity has to congratulate itself. At the assizes at Blandford and Taunton, in 1730, "Chief Baron Pengelly, Sir James Shepherd Knight Serjeant, the High Sheriff, and others, were carried off by infected prisoners, from whom there proceeded a foul stench."

Almost in the memory of man there occurred the Black Assizes (a term by which the like occurrences above-mentioned were designated) at the Old Bayley, in the year 1750; the incidents of which, as recorded in the Philosophical Transactions, were exactly parallel to those above related.

With regard to the specific, and some other infections, their description, and the laws which each species observes, are so various and anomalous that we ought to be constantly on our guard not to be misled by analogies. Some, for instance, have been unwilling to give this name to any species of it but what follows the laws of the small pox, by communicating disease at all times, in all places and circumstances. But as nothing ought to be assumed on such a subject but pure matter of fact,* all systematic simplifications must

* I here wish it to be understood, with a view to avoiding ambiguity, that in the place of making use of the epithets *contagious*, and *infectious*, I mean to employ the term *communicable*,

be avoided, no method being applicable but an historical analysis and delineation of the leading laws and characters of each species.

In further prosecution of the subject, it is proposed to enumerate the various species of communicable diseases, to ascertain by what their communicable nature is regulated, as distinguished from each other, and to point out what are the most approved methods respectively applicable to their exclusion, extinction, and prevention.

DISTINCTIVE VARIETIES OF THE SEVERAL SPECIES
OF COMMUNICABLE DISEASES.

1. AS THEY BELONG TO DISEASES FEBRILE OR NON-FEBRILE.—To the former species are referable small pox, measles, and plague; to the latter syphilis and itch. And we have here a proof among many others of the anomalous nature of this subject, it would be impossible to arrange all communicable diseases under this division, on account of the varieties and irregularities subsisting among them. The hydrophobia, for instance, though it consists of a series of acute symptoms, these symptoms are of a nature so peculiar as not to be referable to fever.

2. AS THE VIRULENT COMMUNICATING MATTER IS VOLATILE OR FIXED.—The former are commu-

wherever it can be done, as embracing the import of both, which, as I have already said, I consider as synonymous.

nicable through the *air*, the latter by *contact*. To the first belong small-pox, and all those which used to be designated by the appellation of specific contagions. Cow-pox is an exception, for though communicable only by contact, its operation is always attended with more or less febrile commotion in the system, and it is evident by its destroying, with some exceptions, the susceptibility to small-pox, that it must produce some material change in the whole constitution. To the other division belong hydrophobia, the vaccine virus, syphilis, and itch, none of which are communicated through the air. This distinction has also its ambiguities, for there is some difference of opinion whether the plague should be classed with the one or the other, or if it partakes somewhat of the nature of both; for it is certainly communicable at a smaller distance than small-pox, and some others. On the other hand, were its virus as fixed as that of cow-pox it is not conceivable how it could be diffused epidemically. There is still another and a more plausible opinion with regard to it, namely, that it is diffusible by dust. And it is certainly conceivable, and even probable, that the virulent matter being dried and reduced to dust,* set afloat in the air by brooms, may be inhaled by the breath; and

* See an ingenious Article on the subtlety and insinuation of dust set afloat in the atmosphere, in the 8th volume of the *Journal of the Royal Institution*, by W. G. Jordan, Esq.

may not this account for the dead body not communicating the plague, as is confidently affirmed on respectable authority. It is also affirmed, on unexceptionable authority, that in the Levant susceptible articles of merchandize are disinfected by plunging them into cold water. Nor can there be a doubt that ophthalmia is communicated by dust; and it seems to be a highly useful precaution to damp with a mop the floor and other surfaces to which dust may adhere in ophthalmic and plague hospitals. It is further in favour of the efficacy of this practice, that the inhabitants of Lower Egypt believe that surfaces upon which dew falls do not harbour pestilential infection. And in reasoning still further on the form which pestilential *virus* assumes, it seems in favour of its being a fluid as well as gaseous* or dry, that the inguinal buboes, one of the most remarkable pathognomic characters of the plague, are not seated in the glands affected with syphilis, but in those which are lower, through which the cutaneous absorbents of the lower extremities pass; and it is not easy to conceive how gaseous matter could be absorbed there in its way to the groin.

3. AS IT AFFECTS ONLY ONCE IN LIFE, OR IS CAPABLE OF EXCITING THE SAME DISEASE REPEATEDLY IN THE SAME INDIVIDUAL.—To the former belong the small-pox, and other specific con-

* A word synonymous with volatile.

tagions, and constitute the main attribute by which they are defined. Of the other, typhous fever and plague may serve as examples. The power of inducing unsusceptibility is extremely dark and inscrutable, while it is of extreme interest and importance as a pathological principle, inasmuch as it proves that febrile action is a restorative and re-active process, for the operation of all these contagions is of a febrile description ; and it is self-evident that unless the living organ were to become unsusceptible, there could be no limit to this process short of the extinction of life.

In pushing our researches further on this subject, we have another example of the endless and unaccountable varieties in every thing that regards it, for to some individuals the variolous infection produces a disease so malignant, that nothing can stay its fatality, while in others the disturbance is so slight as not to deserve the name of a disease, so that there is every intermediate shade of severity and mildness, of danger and safety, in the cases of the individuals whom it affects. And another fact equally anomalous and unaccountable, is that it is established beyond all doubt, that the small-pox and other diseases supposed to attack only once in life, do nevertheless in rare instances occur a second time in the same subject. It is still further remarkable, that almost all the well authenticated cases of second

small-pox, have been of those persons, who in the first instance had undergone it in its most severe and dangerous form. This seems at first sight paradoxical, but on further reflection it will appear that it is what might naturally be expected ; for the mildness of the disease is a proof that the constitution readily takes on the unsusceptible character, whereas the violence of it is an indication of a reluctance and strong resistance against taking it on, so that in those cases where this severe combat barely stops short of the extinction of life, some share of susceptibility is most likely to be retained. The first well attested case I recollect (unless we except that of Lewis the XVth of France, the year before) was that of 1775, which is put on record in the fourth volume of the Memoirs of the Medical Society. This proved fatal, and the first attack had been of the most severe description. Innumerable other cases of the like kind, and equally authentic, have since been published.

It is still further remarkable with regard to the specific contagions, that all of them, including small pox, measles, hooping cough, scarlet fever, observe a different rule regarding the degree of rareness in which they do occasionally recur. There are practitioners who have never seen the small pox twice in the same subject ; recurrence is much more frequent in scarlet fever. In one subject I saw it three times.

But of all anomalies let us most admire and bless that specific disease derived from the cow, with which the age we live in has been astonished and delighted, by its removing the susceptibility to small pox. This too has its exceptions and anomalies, for, though capable of preventing small pox to the degree of extirpating it, the occurrence of small pox after it is far from being rare. It would have been singular indeed, and out of all the rules of probability and analogy, if this infection (itself an anomaly) had not like other contagions had its exceptions and anomalies. The exceptions are in truth numerous, but without impairing the value of that discovery. It has also been found that there are some rare constitutions susceptible of measles a second time, a fact first, I believe, promulgated by Dr. Baillie.* Scarlet fever generally secures from a future one.

The enumeration of anomalous circumstances in the specific infections is not yet exhausted, for it is clearly ascertained that there are constitutions entirely unsusceptible of small-pox, whether casual or inoculated, so that there is a series of constitutions of every possible gradation from the unsusceptible, through all the stages of mildness and severity, to those in which it is irretrievably fatal.

* See Transactions of the Society for the Improvement of Medical and Chirurgical Knowledge, vol. iii. London, 1812.

It may be further observed, that there seems to be some degree of loss of susceptibility in all febrile diseases, immediately after recovery. The very act of recovery seems to imply this. Dr. Russell, though he observed that one attack of the plague was no security against another, yet remarks, that those who escaped were generally safe during the existing epidemic season, and the like has been alleged of typhous fever, so that the result of the febrile process in all cases, is to place the system in a defensive posture, so as to resist more or less, not only the continuance of the morbid action, but to prevent its immediate renewal.

4. AS IT IS PERPETUAL, CONSTANT, AND UNLIMITED, IN DISTINCTION FROM THAT WHICH IS TRANSIENT AND LIMITED, OCCASIONALLY CREATED AND EXTINGUISHED. By perpetual, I mean those which prevail unceasingly, such as the small-pox, measles, and other specific contagions, as distinguished from those which have become extinct, such as the leprosy and sweating sickness; or which prevail for a time, and vanish, such as the influenza. Strictly speaking, there is perhaps no contagion co-eval with the creation of the human species; and, there is every reason to believe from authentic history that there was a time in which small-pox itself did not exist;* but having been once generated and propagated, its nature is such

* See the History of the Small Pox, by James Moore, Esq. Lond. 1815. The first mention of it was about the time of Mahomed, and what has been called the War of the Elephant.

that there could be no prospect of its extinction had not vaccination been discovered. It is not an irrational conjecture that all the specific contagions have taken their origin from animals. We know for certain of one infection that had this origin, namely, the vaccine, and that sort of affinity or affiliation which it bears to small-pox is in favour of this conjecture. It is worth enquiring, as a matter of curiosity at least, whether small-pox can be traced to some graminivorous animal, such as the camel. This has been affirmed, but I know not on what authority. But though the specific contagions may not have been chronologically perpetual, they are geographically universal, for no climate nor season offers any bar to their diffusion in any quarter of the globe; in which respect they essentially differ from the plague and yellow fever. The former has never been known between the tropics nor within the polar circles, confining itself to a range of atmospheric heat not much below 60° nor so high as 80°: nor has it ever appeared epidemically in our part of Europe but at one season of the year, that is, from the end of June to the beginning of November, nor has it ever been known in any part of the New World. This principle is curiously illustrated by an article in the London Gazette, of 21st July, 1721, copied from a French paper, where it is stated that the Marquis de Pons, the Marine Commissioner of Toulon, sent intelligence to Paris that the hot weather

had much diminished the plague in that district, particularly Marseilles ; but that though the heat was not so great nor so long continued as to destroy it, as in Egypt, at the same season, it had been sufficient to cause a great decrease of mortality. The yellow fever has also its geographical and therinometrical range, but different from the plague ; for, it has never arisen but in tropical climates, and never has prevailed but in those climates and in those seasons of the temperate climates, in which the heat is as high as that of the torrid zone, that is 80° or upwards.

There is still another large class of infectious diseases which are not kept alive for ever like the specific contagions, but arise from a certain casual concurrence of circumstances and then die away (though not finally, like the leprosy and sweating sickness, and plague of Athens,*) but

* The characters of the plague at Athens are quite different from those of the modern distemper which goes by that name. It evidently arose out of the extreme hardships of the siege of Athens as related by Thucydides, and became extinct in the course of time. And there is every reason to believe that the plague of modern times, so different from that of the Greeks, emanated by some similar concurrence of circumstances in the early ages of the Christian era, probably that of Justinian, but that it has not become extinct on account of the fatalism or squalid manner of life of the Mahomedans. Another very interesting example of the same principle occurs in the History of England. When Henry VII. then Earl of Richmond, invaded England, and encountered Richard III. at Bosworth, his army had previously suffered a long and most disastrous series of hardships,

repeatedly revive on a renewal of the like co-incidences to which the ordinary course of human life is occasionally exposed. To these belong typhous fevers, dysentery, hospital ulcers, and ophthalmia. It is impossible that any one versant in civil, military, and medical history, can be ignorant of these facts. The example of the typhous fever arising from persons not themselves labouring under fever, but under circumstances of long, accumulated, and stagnant human effluvia is put beyond doubt in the well attested accounts of the occurrences at the assizes of Oxford, 1577, at Exeter, 1583, also at Taunton ;* and of those of the Old Bailey in 1736 and 1750, besides many others in prisons, hospitals, and ships of war.

5. ANOTHER LINE OF DISTINCTION MIGHT BE TAKEN FROM DISEASES WHICH ARE NOT INFECTIOUS IN THEIR FIRST STAGES, BUT BECOME SO IN THEIR PROGRESS.—The typhous fever, including the yellow fever, may be adduced as an example of this ; for when it arises from constitutional tendency,

out of which arose the †sweating sickness, which became extinct about sixty-five years afterwards, in the reign of Edward VI. The leprosy, which spread all over Europe in the middle ages, is illustrative of the same principle.

* See Stowe's Chronicle, Short's Comparative History, and the Gentleman's Magazine for 1750.

† It spread itself first at Milford Haven, while the army lay there previous to their marching into Leicestershire.

from scanty and bad nourishment, from filth, fatigue or cold, it does not become infectious till towards its termination, and not then, if cleanliness and purity of air are attended to. The same may be said of erysipelas and ulcers.* These are carefully to be distinguished from the specific contagions; and as it has been stated that the fever of the Old Bailey was excited without the persons from whom it was derived actually labouring under it, an interesting question occurs, whether the virulent matter be derived from the secretion, or created by concentration and stagnation on the surface of the body. It seems most consistent with analogy to believe that the secretions are virulent, but that they do not prove noxious till they are concentrated to a certain degree, and that the cause of the felons themselves not being affected is that being gradually habited to it, they become insensible to it like the nurses of an hospital.

6. SOME INFECTIONS ARE LIMITED BY AGE—The scarlet fever very rarely affect adults. The great majority are under puberty; some between twenty and thirty; a few between thirty and forty. Only one case above forty, has occurred to my own observation. With regard to the origin of the plague (for it certainly has not existed ever since the creation of the human species,) it may be conjectured, in conformity to the various ana-

* See Medical Logic, p. 279.

logies already quoted, that it was engendered by some singular concurrence of human misery, of which the main elements were crowding, filth, defective ventilation, and intense privations; so that it may be considered as a highly malignant species of typhus.

7. THERE ARISE FROM TIME TO TIME CERTAIN DISORDERS IN SMALL VICINAGES, NOT REDUCIBLE TO ANY RULE.—'They originate from obscure and ill-defined concourse of circumstances manifested only by their effects. There are various examples of them in the Edinburgh Medical Essays, the London Medical Observations, and other collections. There is a remarkable instance of it recorded by Sir George Baker, in the Transactions of the College of Physicians, vol. iii. p. 113, also in the Transactions of the Medical and Chirurgical Society, vol. ii. They are generally attended with pyrexial or exanthemata symptoms; but there is an instance in the Edinburgh Physical and Literary Essays, vol. iii. and in the first volume of the London Observations, which are of a chronic nature; and to the same head may be referred the Pellagra of Lombardy, so well described by Dr. Holland in a separate tract, and also a very singular disease which broke out in the Penitentiary at Milbank in London, in 1823, the principal symptoms of which were those of the sea scurvy. It took the form of a diarrhœa, but was not extirpated till the house was cleared

and purified, with an improvement of diet and discipline.*

But of all the diseases referable to spontaneous generation, the most remarkable in modern times has been the Indian cholera, hatched by some such concurrence of circumstances at Jassore, about 100 miles north-east of Calcutta, to which it was communicated in September, 1817, and from thence over the whole of what may be called the Old World, and reached the British Islands in October 1831. This is of so peculiar and interesting a character, that it is the Author's purpose to make it the subject of separate description or remarks.

8. INFECTIONS MAY BE DISTINGUISHED AS THEY ARE COMMUNICABLE FROM ONE INDIVIDUAL TO ANOTHER OF THE SAME SPECIES, OR FROM ONE SPECIES TO A DIFFERENT ONE.—The only examples of the second hitherto ascertained, are the hydrophobia and cow-pox.

Lastly. THEY MAY BE DISTINGUISHED AS THEY ARE CAPABLE OF BEING CAUGHT BY A SOUND SURFACE, OR ONLY BY A RAW SURFACE.—Of the first kind are all the specific contagions except the cow-pox. To the other belong the virus of cow-pox, malignant ulcer, and hydrophobia. In this

* See examination of this subject before a Committee of the House of Commons, 1823. It proved to be communicable, for it spread to the inmates of those ships to which the prisoners were removed.

respect they resemble the poison of venomous animals, such as snakes, which does not take effect except on a broken surface, external or internal.

From all that has been said, it seems deducible that there is not a secretion nor exhalation of the human body which may not be so vitiated as to produce diseases communicable to others by contact or respiration, under various fortuitous circumstances of concentration and stagnation, application and action ; so that there may be new maladies awaiting our species, which are still to develop themselves under the endless combination of the incidents of human life, through endless ages to come.

The most common situations in which local and transient epidemics arise are jails, hospitals, ships, and the habitations of the poor. But of all these, it is ships that afford the most fertile field for them, from the great variety and peculiarity of circumstances in which they are placed, not only from men being crowded together in close places, especially in stormy weather, when the hatches and other inlets of air are shut, but from the sudden changes of temperature in passing from one climate to another, the peculiar nature of their food and drink, the exposure and fatigue to which they are unavoidably exposed, and the difficulty of maintaining cleanliness. Sea scurvy is one of the most prominent of the diseases fostered by these circumstances, but I do not here allude to this complaint, for this is

not contagious, and is too well known to require notice. What I have in view is, the histories of various disorders which have incidentally arisen in ships of war, and related officially in the Surgeons' Journals, while I was physician to the fleet in the West Indies, and a Member of the Medical Board of the Navy, in London, from the year 1795 to 1802. I shall here transcribe them as I find them in my notes, and as they have already appeared nearly in the same form in the third volume of the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge.

1. I observed in some returns made to me by the Navy Surgeons in the West Indies, while I was Physician to the Fleet on that station, that the spreading of ulcers in certain ships could not otherwise be accounted for, than on the supposition of contagion; and this was put beyond all doubt by facts, which I met with in journals of ships of war, while I was Commissioner of Sick and Wounded Seamen in the Revolutionary War. As these have been already published in different editions of a *Work of mine on the Diseases of Seamen, I need not here enter into any details.

2. Boils sometimes spread in ships, in the manner of an infectious disorder. Instances of this occurred in the Cerberus, Culloden, Penguin, and

* This will be found fully proved and illustrated in the 3d edition of that Work, p. 503.

Snake. The surgeons who report these cases do not assign any cause except one of them, who ascribes it to the eating of fried bacon, and another to the drinking of sea water.

3. Ophthalmia arose, and became general in two ships, before there could be any possibility of its alleged importation from Egypt. One of the ships was the *Overysse*, a guardship in the Downs, in which this occurrence happened in the spring of the year 1798. The other was the *Achille*, belonging to the Channel Fleet, in the spring of the year 1800. Both of these occurred before the invasion of Egypt.

4. In May, 1796, a thrush affected the whole crew of the *Lion*, a fifty gun ship. It appeared chiefly on the roof of the mouth, and produced so much tenderness, as to render chewing very painful. It was not attended with fever, or any other complaint. Fifty of them were treated with purging salts and cream of tartar twice or thrice a day, and the complaint went off in a week or ten days.*

5. I find it mentioned in the Surgeon's Journals, that the mumps (*Cynanche Parotidea*) prevailed epidemically in ten different ships.

6. The surgeon of the *Blonde* frigate reported, that when that ship arrived in the Mediterranean, one-third of the crew became affected with swel-

* There is an account of a thrush spreading from a single case to a whole parish, in the *Physical and Literary Essays of Edinburgh*, vol. iii, p. 65.

led testicles. It is observed in civil practice, that this complaint sometimes arises from a translation of the mumps, but no such occurrence seems to have taken place here.

7. The surgeon of the *Diamond* reported, that, in a cruize in the West Indies, forty of the men were taken ill with typhous fever, at a time when none of the circumstances were present which commonly produce that disease; and he thought that it probably arose from some of the men being affected with the small-pox about that time. One of those in whom it was confluent died. According to the report of the same surgeon, a solitary instance of the scarlet fever appeared about the same time.

8. The surgeon of the *Colossus* reported, that five of the men were taken ill with the scarlet fever, attended with the usual symptoms of malignant sore throat; that one of them died; that two were sent to an hospital on shore; and he believed it was prevented from spreading by destroying the clothes of the men affected, and using other precautions, such as washing their bodies, and fumigations.

9. It is stated in one of the journals of the *Windsor Castle*, a ninety gun ship, that a dysentery became very general among the men, in consequence of a boy having been brought on board labouring under that complaint. This is one of many others equally demonstrative of the infec-

tious nature of this disease in certain circumstances.

10. Two cases of *Plica Polonica* were reported. One was in a boy, who said he had caught it by sleeping with a person who had it, a short time before he came on board. Of the other no history whatever was given.

It is not meant to affirm that all these examples of the production of disease are instances of the creation of infection, though some of them certainly are. They are intended chiefly to shew how disease may originate in singular concurrences of external circumstances, acting in coincidence with some internal predisposition tuned as it were in unison with them, such pre-disposition being acquired also by a peculiar concurrence of circumstances. And it would appear that not only individuals, but whole communities, are affected in various proportions by original or acquired predispositions, and may either be attacked by a disease, or escape it, according as they may be exposed or not exposed to the occasional or exciting cause, as has already been remarked with regard to the plague, and other epidemics.

The next part of this subject which falls to be considered, is that which relates to the means of preventing and extinguishing infection, and the measures best adapted as precautions against its

diffusion. The methods of effecting these objects will be readily suggested by the details already given, and may be comprised in the three words, Ventilation, Cleanliness, and Separation. I have placed ventilation before cleanliness, for it has appeared from facts already adduced, that this is the most essential of the two in preventing the generation of infection, and the formation of its nidus. The most common infection upon which we are called to practise these methods in this country is that of typhus. These are now well understood, and have been successfully practised, not only in the metropolis, but in the principal provincial towns of England, but as they cannot be too often repeated nor too extensively diffused, I shall here recite them, by transcribing my answer to an application made to me as well as other physicians, whose public duties led them to the study of this subject, from Newcastle upon Tyne, regarding the methods most advisable to be adopted for ventilation, purification and separation, with an appeal respecting some difference of opinion concerning the possibility of typhous infections being communicated from contiguous and adjacent buildings.

The following was the substance of my answer, dated 14th of June, and 16th of Sept. 1802.

“ Having been in the constant habit of considering the subject of infection, both in a moral

and medical point of view for the last twenty-three years, from opportunities afforded me, partly in the naval service, partly in one of the largest hospitals of this metropolis, of which I was physician for the twelve last years of that period, I shall return such an answer to the enquiries as a close and earnest attention to this subject enables me to give.

“ I consider the principal utility of hospitals, as institutions for the alleviation of human misery, to consist in their being places of refuge for destitute strangers, as the word implies, and for being receptacles for preventing the spread of contagion. For as there is a certain limit to charity beyond which it becomes a premium for vice and idleness, I am by no means of opinion that sickness in general occurring among the labouring classes, should be indiscriminately provided for at hospitals, inasmuch as it militates against that mutual dependance and protection, upon which are founded all those domestic endearments and duties which are so essential to the happiness and welfare of society in all its ranks.

“ I cannot therefore but concur with you in approving of the establishing of wards exclusively for the reception of fevers, as long as the present epidemic continues.

“ In addition to the forcible reasonings contained in the papers you have transmitted to me, I will beg to present the subject in another point

of view, tending further to recommend this arrangement. From much observation, as well as unquestionable testimony, I am well convinced that, though the fever itself does in certain circumstances generate infection, the most frequent and virulent instances of it originate, not from the fever itself, but among those in health from want of ventilation and cleanliness, combined occasionally with scanty and bad food. My meaning will be best illustrated by an example. In the sessions at the Old Bailey, in the year 1750, so noted for its calamitous consequences, it was remarkable that the prisoners who communicated the contagion were not themselves ill of fever; and it is perhaps still more remarkable, that none of those who were ill of it, to the greater number of whom it proved fatal, communicated it to their families and attendants. It is not to be inferred from this last remark, that these fevers were not infectious, as some have ventured to affirm.* It only proves that those who are treated in clean and airy apartments, such as those inhabited by the better sort of people, who were the victims of this infection, do not communicate the disease even to those who are in the constant habit of approaching them. I have invariably made the same remark in those naval and civil hospitals, which I have had a share in

* See a Paper confirmatory of this, Medical Transactions, vol. viii. p. 245, by Dr. J. Hunter.

directing; and when rare and accidental instances of infection have occurred in them, there is reason to suspect that it has been introduced from the original stock of it previously adhering to the clothes or hair of the patient, and not generated in the course of the fever. And when any such fever has occurred in private families in which I attend, I constantly assure the family, without having been once mistaken, that if perfect cleanliness and sweet air are maintained, there is no occasion to dread any communication of the disorder to others.

“ In what has been said, a clear answer will be found to the query regarding the danger of fever being communicated from one ward to another, or from a fever-house situated close to an hospital. Since perfect ventilation and cleanliness were adopted at St. Thomas’s Hospital, cases of fever have not communicated it even to patients in the same ward. This was far from being the case in former times, when not only the patients, but the medical and menial attendants were frequently and fatally affected with it. The celebrated Dr. Akenside, the poet, a native of your town, and physician to this hospital, was said to have died of it.

“ All this naturally leads to the remark, that during the prevalence of a typhous epidemic, measures should be adopted with the utmost

anxiety for striking at the root of the evil, by carrying the methods of purification into the habitations of the poor where the seeds of it exist, and where the first step to be taken, is the removal of the sick. It is needless to inculcate on the medical faculty, and the magistracy of Newcastle, how much *prevention* is superior to *cure* in point of economy as well as humanity. About two years ago an infectious fever broke out in some country parishes about forty miles from London and proved very fatal, particularly to young people; and having spread to those in the upper ranks of life, a nobleman in the neighbourhood consulted me concerning it. I recommended that parochial visitations should be made, in order to establish cleanliness and ventilation in the habitations of the poor; to supply them with mops and brooms, and, above all things, with a sufficiency of soap; to render the windows moveable where they were fast; and to furnish some articles of bed and body clothing; but in no case to give money, and to find a liberal supply of food only to the poorest, lest they should be rendered too independent of their own industry. He has since informed me that the plan answered perfectly, and had been the means of preventing much misery, and of saving many lives."

[Here followed a description of the best methods

known of ventilating hospitals ; but as these are described at p. 34, and 185, of this work, it is unnecessary to repeat them here.]

“ As it has, I hope, been fully established in evidence that typhous infection may be generated independently of fever, and that it will not arise in the course of the fever, except in cases of gross neglect, constituting a material difference between this and the infection of the small-pox or plague, so will there be a corresponding difference in the precautionary measures to be adopted in these two species of disease.

“ In taking these measures, it is of fundamental importance to ascertain what may be called the sphere of diffusion, and to bear in mind that it is the living human body which is the source of the deleterious vapours, and not the atmosphere. With regard to the plague, no medical man of the most ordinary education can now be misled by so gross an error, but it has been of the most mischievous consequences with regard to those officers of police to whom preventive measures have been entrusted. When it was believed that it proceeded from a contaminated state of the whole atmosphere ; the nature of the danger and the means of averting it, were equally misunderstood ; for, if the sphere of infection extended to the whole atmosphere, there could be no more danger in the closest approach than at the greatest distance, and the measures adopted

under this error were perfectly futile and unavailing (and would have been so even if the imaginary cause had been the real cause,) such as the lighting of large fires in the open air, and the firing of artillery, to the neglect of the rational and efficient means of cleanliness, ventilation, and separation ?”

Some readers would perhaps be disappointed if nothing were said about the chemical methods of destroying infection. I mention it last, not from an absolute distrust * in the efficacy of the vapours of the mineral acids; but they are applicable only in cases of very rare occurrence, and would be of little avail, unless accompanied with the means already so strongly inculcated. There seems to be evidence of the good effect of the fumes of mineral acids, particularly the muriatic, in cases of a single apartment, but in an extensive trial of it in the plague at Odessa, it had no sensible effect in destroying the infection. But if this practice should not be suffered in any case to interfere with, nor made to supersede other and

* In looking over my notes on the Reports of the Navy Surgeons in the Journals, on the effect of the nitrous fumigation of which they were enjoined to make trial, I find that eleven ascribe some efficacy to it, and that nine deny any benefit from it; and as it does not appear that in any of these cases it was employed exclusively of other means of purification, there must be great ambiguity and uncertainty in appreciating its efficacy.

better means, there can be no objection to adopt it as an auxiliary.

Among the measures, under the head of precaution, the inoculation for the small-pox falls to be mentioned. The first notice we have of this is traceable to a superstitious practice in the East, where it was believed that the *buying* of the small-pox, as they called it, tended to mitigate its violence. The *virus* for inoculation was taken from a pustule, and a piece of money left as the price of it. The genuine physical cause of the superior safety of this to the casual infection is very obscure. It may naturally enough be alleged that when inserted by art, on the surface, it is less likely to produce dangerous effects than when casually caught by the *virus* being applied to the lungs by respiration, or to the stomach by deglutition. I have seen in the inspection of the dead body evident variolous pustules in the trachea, bronchia, œsophagus, and stomach. This, however, cannot be the sole cause ; for, the casual small-pox is sometimes as mild as the inoculated, and the inoculated sometimes as malignant as the casual. This may be partly ascribed to the great diversity of constitutions ; for in some, the susceptibility is so great, and the tendency to malignity so uncontroulable, that if the whole species were similarly constituted the human race would infallibly be extinguished. But it is further observable that the same individual is differently

susceptible at different moments ; for it is well known that a person who has at one time been exposed to strong casual infection has escaped it : and at another, has caught the disease from an exposure so slight as not to be traceable. But this unsusceptibility exists in a few individuals not at certain *moments*, but for a large portion of life ; for every one who has observed and practised on a large scale must have met with subjects who after being exposed repeatedly, as in the case of mothers attending their own numerous families in small-pox without catching the disease, have in advanced life been unaccountably seized with it. In reasoning upon this, it seems conceivable, and even probable, that as casual infection is taken in by the inhalants, which are not always in an absorbent state, or humour, as it were, and may in a healthy state of the body reject extraneous and acrimonious matter, agreeably to that elective power, which these vessels are alleged to possess, so they will imbibe it when in a less healthy state, and when the body is prone to fall into disease. If this is admitted, it will account for the greater danger of the morbid action, when it arises from the spontaneous inhalation of the poison, than when it is obtruded by art ; and it will also account for the inoculation proving sometimes as fatal as the casual disease ; for, the artificial insertion must occasionally co-incide with the fit of morbid

propensity which gives effect to the casual infection.

This mode of mitigating the most dreadful of all epidemics, however curious and admirable, has proved of no substantial benefit ; for, though it has saved the lives of a small portion of the community, it has encreased the general mortality. Nor could any practicable means of separation have ever subdued this greatest foe of the human race. This was reserved for vaccination, a discovery which affects the destinies of mankind more than any other medical improvement that was ever made, and cannot fail to impress us with a high opinion of the value of researches into the secret ways of Nature ; for, there may be other undetected truths still lurking under her very surface, which if brought to light, may be of the utmost avail to our best interests.

The only question now remaining to be touched upon regards the discrimination of disorders which are contagious from those which are not so.

There is a great diversity in the causes by which multitudes of human beings come to be afflicted with the same malady at the same time and in the same place. 1st, Contagion, of which small-pox may be taken as the most simple archetype, or representative. 2ndly, A community of circumstances in point of diet and other con-

ditions, whether natural, as in the water, or artificial, as in the quantity and quality of food, also fatigue and exposure to the weather. Among those proceeding from water, may be reckoned the swelled leg of Barbadoes and Cochin, and the Cretinism of the Alps. Of those proceeding from scanty and bad food, the typhous fever may serve as an example, and of those caused by fatigue and exposure, various febrile affections, such as inflammatory fevers, acute rheumatism, and pneumonia, constitute the most important heads. 3dly, The temperature of the air, and the seasons of the year. Of these, the bilious fevers and cholera, occurring chiefly in hot climates, or the hot seasons of temperate climates ; also the pulmonic inflammations of the vernal season, and the bilious affections of the autumnal season in our climate compose the greater part. 4thly, The most common of all, and the most accurately defined, is the intermittent fever found to exist only in marshy and woody districts, as exemplified in Zealand and in the eastern counties of England, and the remittent, as exemplified in the jungle fever of India, the malignant fever of Batavia, and the simple form of the yellow fever in the Carribean islands. All these proceed from a soil from which certain poisonous exhalations of an unknown and incoercible nature emanate and contaminate the atmosphere.

These causes sometimes act alone, but fre-

quently in conjunction, and this seems to have been one of the causes of the ambiguity which has given rise to so much controversy: that is, the casual mixture of infection, generated by, and proceeding from the living human body causing *epidemic* complaints, with those which are generated by, and proceeding from certain characters of soil, causing *endemic* complaints.

It is a matter of surprise to perceive what confusion and blindness there has prevailed in all ages, both in the language and ideas, relating to the discrimination of the terms epidemic and endemic, also of infection, contagion, communicability, and their contraries. We should hardly expect to find in the luminous page of Mr. Gibbon, when giving an historical account of the great plague of the 6th century, which spread over the known world for fifty years, that after having correctly stated that it spread by contagion from one region to another, he should, towards the end of this eloquent passage, make use of a language quite incompatible with such a conception; for, in spite of his well known acuteness and precision, he represents this calamity as depending on a universally corrupted state of the atmosphere, an opinion utterly incompatible with its being contagious. He slides as it were into a train of expression and thought abhorrent to every arrangement of the subject, logical or philological. As he was an extra-professional author, some allow-

ance was to be made for him, but it is difficult to find any excuse for the same confusion of ideas in Mead and other professional authors, for more or less of the same ambiguities and errors are found in the writings of some of the most eminent of them. It does not appear that Sydenham was quite convinced of the contagious nature of small pox. One would suppose that hardly any ground of distinction could be more clear and distinct than that which is founded on the exhalations of the soil, and those of a morbid human living body; yet there is hardly any medical writer, even of the eighteenth century, who does not forget the due discrimination of epidemic and endemic, and that the admitting of any disease belonging to the latter, being of a contagious or communicable nature is a palpably absurd solecism. But let it not be supposed that this is a mere grammatical or rhetorical criticism, for such gross confusion of words leads the parliament and the public at large into the like loose and irreconcilable forms of expression, so as to imbue the mind with serious misconceptions with regard to the whole practical system of prophylactic medicine, on the clear and correct understanding of which all the rational and efficient measures of prevention must be founded.

The main points of difference in these two great classes of disease consist in the endemic being extremely various, as has been so fully ex-

plained in the course of this Dissertation, and which will readily occur to any professional man when he reflects on the great number of specific contagions, acute, chronic, impetiginous, fixed, or volatile, as compared with the endemic existing in the utmost simplicity, in the form either of the intermittents of Zealand and Lincolnshire, or that of the remittents of the Indian jungles. They differ also in the law of their progression, the exhalations of the body being restricted to the contact, or immediate vicinity of the morbid body, the progress therefore being dependent on human intercourse, and therefore slow ; whereas, that of the other being dependent on the rapid mobility of the atmosphere, must in the nature of things be simultaneous. There is however one point in which they both agree, which is that of those who are exposed to the respective exhalations, whether atmospherical or morbid, various proportional parts are actually seized. Among the epidemics the proportion is very various, whether the virus be conveyed by contact and close approximation, or at a distance, by *fomites*. Of the plague, for instance, Dr. Russell, so long physician to the factory at Aleppo, found that of one hundred fully exposed to the infection of that epidemic, about ninety would be seized ; of the small-pox a much greater proportion would be exempt. The smallest proportion of any known epidemic is perhaps the newly imported epidemic,

the Indian cholera, which will account in a great measure for the peculiar rapidity with which it disappears and again returns ; and it differs greatly from the aerial virus in this respect, that every mortal must be exposed to the latter, for every mortal must breathe the air ; whereas, the virus of the morbid body can be inhaled only by those few who approach closely, a circumstance, which by a strange perversion of reason, the non-contagionists have stated as favourable to their opinion, but any child may perceive that it militates on the opposite side of the question. The truth is, that it has pleased Almighty God in his mercy to smite only a certain proportion of those exposed either to the one or the other, and a majority of them in a degree short of fatality, otherwise the human species would be extinguished.

Such are the leading principles, if I mistake not, upon which questions of this nature are to be decided.

There is one other general remark which it is useful to mention, namely, that as the miasma of the soil is extremely simple, and the diseases of infection extremely capricious and anomalous, it is much more probable, considering the matter abstractedly and *a priori*, that, in a questionable case, contagion should have a share in it, than that the other should be the exclusive cause. For instance, no one ever suspected that the agues of Zealand or of England were infectious, and one

does not see how any such suspicion could, without some substantial reason, attach to the yellow fever, if it were in all cases purely endemic, like the European ague. But as this fever has been the great *arena* of controversy, any further discussion on this subject shall be deferred till it comes to be considered in a subsequent article.

There are two other epidemics which have also been the subject of controversy, and over which there seems to hang still greater ambiguity. These are the spasmodic cholera of India, and those influenzas or epidemic catarrhs which have been noticed in the records of physic for several centuries past, as extending themselves at shorter or longer intervals over large portions of the habitable world on both sides of the Atlantic.

The former made its first appearance at a district called Jessore, about 100 miles to the N. E. of Calcutta, in August, 1817, and spreading from village to village, reached Calcutta in the following month. How it originated at Jessore is a matter of uncertainty, but the most probable conjecture is, that it must have been generated by some such fortuitous concurrence of circumstances as has been noticed in a former part of this Dissertation. From Calcutta it spread up the Ganges, along with the reinforcements, making the most tragical desolation till it reached the grand army, assembling in Upper India. In this progress its course was in a direction opposite to that of the periodical winds which

prevail at that season. It continued its course through the countries invaded by the army, and reached Bombay in September, 1818, one year after it first appeared at Calcutta. From thence it spread across the peninsula of India till it reached Ceylon in January, 1819. About the same time it crossed the Bay of Bengal, and made its way by sea and land to further India, and through various countries, seas, and islands till it reached China in 1820. In the following year it reached Persia in all its horrors. But one of the most remarkable and interesting incidents regarding its progress is, that in November 1819, it made its appearance in the island of Mauritius, near 3000 miles from the coasts of India. This happened immediately after the arrival of the *Topaze* frigate from Ceylon, and this ship had lost several of her men by this disease even on her passage, as appears by the Surgeon's journal. Now, it would appear on a superficial view that this had some connexion with the frigate, or why, it may be asked, might not this disease have broken out at any other spot on the earth or ocean at the same distance from India? But it does not appear that it did; so that its appearance at that time, in this little island, must have been a mere casual co-incidence, unless infection is admitted. But, say the partisans of the opposite opinion, it is not only mathematically true that matter is infinitely divisible, but that there is no fact more familiar than the boundless divisibility of it in

the case of odour, musk for instance ; also the scent of game to a hound, and the obscure and remote manner in which the morbid virus of small-pox and other specific contagions is conveyed. The simple answer to this is, that supposing the *virus* of cholera to be by admixture in the atmosphere carried through any extent of space, it would, by the same mathematical rule, be diffused like other elastic fluids, *quàquàversus*, in a sphere and not in a line, far less confined to a line, in which living human beings happen to be transporting themselves over sea and land. But neither these, nor any, nor all the facts here recited have been admitted to be decisive of the question. On the contrary, there are many gentlemen of decent character who sturdily maintain that it cannot be contagious. I am bound, therefore, to deliver my opinion with becoming diffidence, and to leave its final decision to those who may receive still clearer lights on the subject.

With regard to the influenza, of which according to Dr. Haygarth, there are four hundred instances on record, its spread has been so wide and so rapid, as to afford the highest presumption of its being contagious. According to some accounts, its attack has either been simultaneous in distant places, or so rapid as to make it inconceivable how it could be conveyed by human intercourse :*

* The principal influenzas recorded by English authors have

while others have reported that they could trace its local progress. There are no grounds for impeaching the fidelity of either of these testimonies. Nature seems as it were to be inconsistent with herself. But neither can this be the case; so that in concluding this Dissertation, as in commencing it, I have found difficulties with which I confess myself to be unable to grapple. And were I to attempt a solution of them, I should run the risk of making such a botch of this sublunary subject, as Ptolemy the geographer made of his celestial system. Believing, however, as I do, in the wisdom of the Author of Nature, I shall not be betrayed into the same impiety, or rather levity, of expression, as is imputed to king Alfonso the Wise, who while he was studying the cycles and epicycles of the Ptolemaic system said, that "if he had been consulted he could have recommended a better disposition of the movements of the sun, moon, and planets;" let us rather hope that in the lapse of ages another Copernicus will arise, who will vindicate the consistency of Providence in the disposal of the human destinies, as has been achieved by this great man in expounding the mechanism of the heavens.

been those of 1732, 1762, 1775, 1782, 1803. Some of the best accounts of them are to be found in the 3d. vol. of the Medical Transactions of the College of Physicians, and the 6th vol. of the London Medical Observations. Its duration in them all is stated to have been from a month to six weeks.

APPENDIX TO DISSERTATION VI.

I HAD proceeded thus far in the second edition of this Work which appeared in November, 1822. The Indian Cholera had at that time made a most alarming progress, but I could hardly persuade myself that in the course of the ten subsequent years it would continue to make such progress as to equal, if not to exceed, in its calamitous extent, any other epidemic recorded either in ancient or modern history. In offering a second edition therefore to the public, the Author feels it incumbent upon him to fill up the account of its progress during this intermediate period. And it is important that he should do this in the most compendious and speedy method; for as the most interesting view of it consists in the decision of the question relating to its being communicable or not, no time ought to be lost in diffusing this information. For if it is communicable, as the Author of this believes it to be, instead of composing a new and detailed history of it, he will merely transcribe the most authentic records of its advance since the year 1822.

The evidence which he means to adduce of this fundamental point is meant to prove that in all cases, except at its origin, it can be traced as matter of fact to human intercourse. And with regard to its origin, he has just said that it arose at a place called Jessore, about 100 miles N. E. of Calcutta, in August 1817; and if it should be asked how it came to arise there, he can only answer by alleging, that it has done so in the same manner as some other epidemics, that is, from a singular concurrence of circumstances, the main elements of which consisted in certain unprecedented combinations, arising out of the miseries of mankind consequent upon war, famine,

squalid habits, crowding, and other elements of human misery. And if examples are called for, we can quote the plague of Athens, as described by Thucydides, the plague in the time of Justinian, which has probably been known at times ever since, chiefly in Turkey and the Levant; the leprosy of the middle ages all over Christendom; the sweating sickness of England, from 1485 to 1553; all which, except the Levant plague, appear to have been engendered as new complaints, and to have vanished after a prevailing duration of more or less extent; some other examples of the like creation and evanescence of new complaints of a more obscure and less important nature, have been mentioned in this Work at page 319.

The following extracts from my Correspondence with the Court of Directors of the East India Company, who did me the honour to consult me on this subject, will fill up the account of its progress from 1822 to 1825; from which time to the present my principal authorities will be derived, chiefly from the work of Dr. R. H. Kennedy, an extensive eye-witness and practitioner in the complaint. It is entitled Notes on the Indian Cholera, and by far the most able communication of any from the several Presidencies, all of which were communicated to me by the Court of Directors.

The following are extracts from that Correspondence.

No. I.

GENTLEMEN,

London, 16th Jan. 1825.

Absence from town and urgent business have prevented me from acknowledging sooner the receipt of your letter, together with the Report of the Medical Boards, which you did me the honour to send me on the 15th of last month.

Though I almost despair of throwing any further light on this very obscure but important subject, I must not decline

offering such remarks as occur to me regarding it; for though I have no actual observation nor experience of it, my public duties have led me to bestow much time and attention on the subject of contagion in general.

I begin with congratulating you on the high professional talents of your medical officers in India, which have been displayed in the great ability, candour, zeal, and unwearied diligence, observable in the late Report from them. It is therefore with all due diffidence that I venture to make any comments upon them, and shall confine myself to the question regarding its infectious nature, and whether on any occasion means preventive of its spreading can be available.

1st. The first remark I shall make is, that those who advocate the opinion of non-contagion appear to me to lay too much stress on the circumstance of great numbers escaping the disease who have been exposed to it by near approach or contact with the sick; for it is well known in the history of contagion that in consequence of the great variety of original constitutions, as well as the acquired and fluctuating predispositions of individuals, this is the case more or less with regard to every species of contagion; *and indeed if this were not the case the human species would long ago have become extinct through the operation of pestilence.*

2ndly. My next remark is, that it does not seem to me that those who have argued this question have been sufficiently aware, that whatever weight may be conceded to the above-mentioned argument, it militates much more forcibly against the supposition of aerial influence; for in this case, and even in conformity with this very argument, not a single human being could escape, inasmuch as every living creature must breathe the external air, whether pure or contaminated; whereas, it is easy to conceive that if the noxious principle resides in the morbid emanations of the human body, great numbers may never come within their sphere, either by contact or approach. So many, (say they,)

are exposed to the contact or approach in certain spots, that they could not escape but by a *miracle*; but how *much* greater a miracle would it be if, according to their theory, a single individual should escape, for every living creature must every moment inhale the open air impregnated with the *virus* which they believe communicates the disease. Is it possible to conceive a greater degree of fatuity and blindness in a reasoning mind.

3rdly. I have next to observe, that there does not appear to have been sufficient importance annexed to a circumstance which I apprehend may be considered as a satisfactory criterion for discriminating contagious, or what are called technically epidemic diseases (but which would be more clearly expressed by the term communicable,) from those depending on the state of the soil and air. It must, in the nature of things, attack *simultaneously* all those who are exposed to it; whereas, if it proceed from any morbid principle generated in the human body, its attack must be *progressive*, for a certain space of time is necessary for it to pass from one individual to another, and still more from one region, and community to another. I ask if it is reconcileable to reason that this disease could have advanced gradually from Bengal where it first appeared in 1817, to Bombay, which it reached about twelvemonths afterwards, following the track of the army, and against the monsoon, in the commencement of the Pindarree war, through any other medium than that of human intercourse? The whole history of the disease is an exemplification of the same proofs, and may be strikingly illustrated also by the latest accounts we have had of its progress from India, through Persia to Syria and Astracan, by the route of the caravans which conveyed it to these countries last year. Can any thing be more inconceivable or more repugnant to the plain good sense of the most ordinary understandings, than the idea that this could be effected by any quality of the air or exhalation of the soil, either following in those tracts,

or by continuous and successive generation in them for the fourteen years, during which so many countries have successively suffered under this calamitous scourge?

4thly. I wish next to remark, that those who have argued against the existence of contagion, from the impossibility of tracing it except at considerable distances, do not seem to be fully aware that the like argument might be adduced against the existence of the contagion of small pox and measles, which, as every one knows, are frequently caught under circumstances of time and place, which would be held decisive against their being contagious were this not fully established by other facts, such is the extreme subtlety of all infectious matter.

Whoever will apply their minds to the consideration of this subject with that gravity and anxiety which the cause of truth and humanity so loudly call for, will find that this disease in regard to its communicable nature is regulated by the same laws as other epidemics, differing only in degree and not in principle, and that these differences consist merely in the degree of susceptibility in point of duration and extent, just as plague may differ from small pox, measles, and hooping cough, and to a smaller proportion being susceptible. This perfectly accounts for the short visits it pays, and after having caught up the few that are susceptible at any one time or place, it may, and actually does return, not once but several times, and seize a few more victims, who have become susceptible in its absence. Is not this precisely the way in which small pox deals with the human species? And how can any mortal conceive that a certain portion of pestilential air can be conveyed over sea and land, accompanying ships or armies, and leaving those around them scathless.

But the great points of practical importance in this discussion are, whether, from what we know of this dreadful disease, any hope can be entertained of employing practical and available means of excluding, averting, arresting, and extinguishing its ineffable horrors.

This point, as well as some others, respecting the question of contagion, will receive considerable illustration from what occurred in the Isles of France and Bourbon (the former has already been adverted to,) in the year 1819. What is called the Indian Cholera, but which ought to be more properly styled the *Malignant Spasmodic Colic*, made its appearance in the Isle of France on or about the 20th Nov. 1819. The *Topaze* frigate, from Ceylon, where this disease was prevailing, and which actually prevailed in the frigate, four men having died on the passage, arrived at this island on the 27th of the preceding month. *Can there be a doubt in the mind of any human being* that this disease, never before known here in an epidemic form, was imported by that vessel? Is it conceivable that the air of the continent of India or of Ceylon could be wafted thither at the distance of near 3000 miles along with the frigate, or that just at that point of space and time the air of the island itself should have become contaminated? After prevailing for a few months it vanished, for it is one of the peculiarities of this disease, that after rapidly selecting its victims, consisting of those who by some obscure predisposition are alone susceptible of it, it disappears. The great importance of this incident must be the Author's excuse for repeating it.

From the circumstances of its appearance in Bourbon, leagues distance, we are led to some still more important inferences. The Governor of that island, under the strong conviction of its infectious nature, took measures by proclamation to bar all intercourse with the Isle of France. But in spite of this, a boat, from the shore of Bourbon, had clandestine communication with a small vessel, called the *Pie Vert*, from the Isle of France, probably about the 8th or 9th of January, for she left Port Louis on the 6th. After the usual interval the disease shewed itself, so as to leave no doubt of an infection, traceable to the boat, and which spread to one of the quarters of the town. The Governor, with that vigilance and energy which was in his character, instantly adopted such measures of police by *cordons* of troops, and

by conveying, without loss of time, the sick to a lazaretto, that the further progress of it was arrested, and in a short time it vanished. In the Isle of France (the Mauritius,) on the contrary, where no such step had been taken, the disease spread to the whole town, and to the rural population to a calamitous degree.*

In addition to the Letter containing the preceding Extracts, I wrote three days afterwards to the Court of Directors as follows :

GENTLEMEN,

Sackville-street, 9th Jan. 1825.

Since I had the honour of addressing you a few days ago, I have had intelligence through a channel which I consider as authentic, that in the year 1821, when the Cholera raged in Persia, the city of Ispahan was saved from it by the vigilant measures of the government; for as they saw every reason to believe that it was communicable by caravans, the Governor General of the Province of Ispahan, hearing of its being at Schiraz, and other places with which there was intercourse by caravans, gave orders that they should not pass through the capital, but take the route of Yezd. Ispahan was saved from it, but it broke out at Yezd.†

Through the same channel I have learned that this disease has reached the Port of Laodicea (or Latike,) in Syria,‡ as well as Antioch and Aleppo.

* Governor Farquhar stated the mortality at 7000.

† I ought to have mentioned that the like safety was procured for Teheran, the seat of government of all Persia, but this precaution having been neglected in the year 1829, the Cholera, with its usual consequences, visited that city.

‡ It is somewhat singular and curious, though deeply affecting, that the great epidemic of the Western World, with the like medical controversy regarding it, should have spread itself eastward so as to reach one extremity of the Mediterranean Sea, while the great epidemic of the East in its westward progress has reached the other

The most interesting and ample mass of information on this subject has been drawn up and communicated to the Public by the Chevalier Moreau de Jonnès, Reporter of the superior Council of Health appointed by the French government to investigate it. He was by profession a military engineer, who served in Martinique, but his mind being by inclination devoted to matters of general scientific research, particularly those which have relation to philanthropy and patriotism, he engaged warmly and deeply on all that related to the Yellow Fever, and the report above-mentioned on Cholera is a specimen of powerful and ingenious investigation, founded on personal observation. He is one of the most active members of the Institute of France, and is well known to me by correspondence, having been some years ago elected into that body. It is from his work, that of Dr. Kennedy, and the ample reports sent to me by the Marquis of Hastings, published in the 11th volume of the Transactions of the Medico-Chirurgical Society as long ago as 1820 ; and the reports of the Medical Boards of India, communicated by the Court of Directors, that the Warnings and other Works on which I have employed myself since the alarm of this hideous epidemic reached England last summer, that my intelligence is derived.

I was at that time at some distance in the country, for my own health and that of my family. When I returned to town on the thirteenth of September, and found that though the Government, with that paternal solicitude which might be expected, had appointed a Board of Health, on the first of June, they had omitted what I considered as a material point in preventing the introduction of contagious diseases of this nature, a previous attention to ventilation and cleanliness before that actual

extremity of that sea ; for the Yellow Fever has made dreadful ravages in Spain in the course of the last 25 years, and Italy itself has not quite escaped it.

invasion of the enemy, as expressed in military phrase, but as they had not been required by their instructions to adopt any active measures till the landing of the enemy (as they understood their directions,) I found no practical steps had been taken as yet, though the Board of Health had been founded on the 20th of June, and it was now the middle of September.

As I thought this an important point, and understanding that the Board of Health had no intention of acting on their instructions till the actual appearance of the malady, I resolved to lose no time in fulfilling this duty myself. It ought to be mentioned, in justice to the Board, that they had drawn up a tract containing instructions for preventing the *spread*, though not for the *exclusion*, or barring of it out as it were. This was not deemed well calculated for circulation on account of its bulk and unpopularity, though most laudably inculcating the reality of contagion; and two of their own members, Dr. Macmichael and Dr. Bisset Hawkins published each a tract in the same spirit and principle, but objectionable also by forgetting to insert the recommendation of the means of *exclusion*. Dr. Macmichael's tract from its compendiousness was well adapted for circulation, and consisted of much curious and interesting information regarding the general history of contagion, particularly as it regarded the tenets, doctrines and doubts of Boerhaave, Sydenham and Mead. I can fully attest the truth and fidelity of the facts he refers to, for the first notice of them was published by me in the Medico-Chirurgical Transactions of 1820 in Vol. II. The work of Dr. Hawkins consisted of an ample Treatise on the subject, containing a large mass of very excellent information, sound practice, a wide scope of research and erudition, the whole composed with great judgment and industry.

I was resolved therefore to persevere in my purpose, and was fortunate enough to meet with the powerful co-opera-

tion of two of the Cabinet Ministers, to whom I was well known, the Duke of Richmond and the Marquis of Lansdowne. It happened most opportunely that the Duke, in quality of Postmaster General, consented with the most benevolent zeal to circulate under his own cover the great numbers of my tracts abovementioned ; and the Marquis, in a spirit equally patriotic and humane, approved (without any official sanction) of my using my best endeavours in aid of the Board, in the formation of which he had the principal hand. But as its duties consisted more in executing matters of police than in medical duties, and as they had hitherto made no progress in the main object, it was abolished and another appointed, consisting chiefly of members of the Revenue and other Public Boards, with Sir W. Pym for its principal Medical Member. I had drawn up my tracts entitled “ Warning and Admonition to the British Public on the subject of Indian Cholera,” printed them and put them into the hands of the Postmaster-General, who on the 18th of October sent them to all the Seaport Towns of the three Kingdoms, particularly those on the East coast of England and Scotland, where I predicted the disease would first shew itself. It is not for me to proclaim the benefit of this, but certain it is that the disease had not landed and taken root in Sunderland, till the 26th of Oct. 1831, when two men, father and son, employed as keelmen, were taken ill and died of it, the one on the 26th and the other on the 31st. A grand-daughter was taken ill but recovered ; a nurse at the infirmary who laid out the body of him who died ; the house surgeon who had examined the nurse’s body was taken ill in the street, but recovered. There was a quarantine and Board of Health at this port, and as the disease continued to spread, the Board at their meeting on the 1st of November, voted the disease to be contagious. It is a painful task to relate what ensued, for a new Board of Health, on the 12th of November, voted it unani-

mously not to be contagious, an opinion to which they were no doubt led, by seeing the same opinion inculcated in a periodical work which just then appeared,* and as it was extremely favourable to the interest of commerce, they most eagerly adopted it, and the Central Board was greatly blamed for not counteracting this by sanatory measures. From Sunderland it soon spread to Newcastle and other seaports on the same coast ; for this erroneous opinion having been disseminated immediately after the circulation of the Warnings, their good effect was nearly defeated. This did not discourage me from repeating the like circulation of these tracts, so as in the whole to amount to several thousands.

The following narrative, taken from the most authentic sources, affords a sufficient proof that Sunderland was the only port to which it was introduced from the Continent, and from thence disseminated over the three kingdoms. A most respectable board of health had been constituted at that place, presided by Dr. Clanny, the preceding summer, and there was no appearance of disease till the end of October. A quarantine had been kept up as perfect as the situation of the place admitted, besides other precautions. On the 19th or 20th of that month, my Warnings, conveyed by the Postmaster General, reached the magistracy of Sunderland, at which time the place still remained free from disease ; but in a few days afterwards, there was published in the periodical paper above mentioned a strong asseveration that the complaint was not of a communicable nature ; and as the qua-

* Mr. Ainsworth, who has published a respectable tract on the subject, says that they were still further encouraged by some “ insignificant medical practitioners whose doubts were converted into facts, a procedure which met with such a glad reception among those who suffered by quarantine regulations, that the party became influential enough to supersede and paralyse the efforts of the former board.”

quarantine and the other means of prevention were injurious to the interests of commerce, the self-constituted board arose, which abolished the former, and declared, in the most vehement and abusive terms, that as the disease was not contagious all means of precaution ought to be laid aside. It is difficult to excuse the central board for not having interposed at this time, for a free communication with Sunderland was permitted by sea and land to the metropolis and other parts of the sea coast, and it was no doubt in consequence of this abolition of quarantine that the disease in its true character broke out on the 26th of October, that is one week after the arrival of the Warnings. The authorities therefore to whom these Warnings were directed must have acted in contravention of them, by proclaiming the disbelief of contagion, and suspending all precautions in the course of that week, as appears by comparing the dates of these incidents. One of the nurses and the house surgeon employed about them were taken ill, the former fell a victim, the other recovered. From that time it went on multiplying. The Government had by this time taken a proper alarm, abolished the local board, and constituted a new central one. These new boards were composed of gentlemen extremely well qualified for the duty. Dr. Daun, from India, was sent to Sunderland, and the medical members of the new central board were Sir W. Pym and Doctors Barry and Russell; but alas! it was too late; for it was found that the former board had been acting under a complete system of fraud and concealment, to which the whole future mischief was imputable; for it is in vain to deny that Sunderland was the first and only port into which it was introduced, and that to this spot the whole diffusion of it through the British isles is traceable; and the new local board concludes their first Report, on the 10th of November, in the following words: "from the want of unanimity and energy at the first moment, and subsequently from the unmanly opposition to truth of

a willful few, a malignant pestilence was allowed to gain a footing in our happy and healthy shores." So that it is evident, that if the Warnings transmitted by the Duke of Richmond had been promptly acted upon, the British coast would not have been visited by this most dreadful malady. Indeed, the conduct of those who baffled this salutary measure by a system of misrepresentation and delusion would merit the character of flagitious and sordid, were it not that this heavy charge is in some degree palliated by the excuse of ignorance. Their names therefore are not mentioned. But it is hard to conceive any men's consciences less at ease than those of the persons who have taken part in these practices. And as it is of the utmost importance for future example that the guilty should be convicted, and that an unimpeachable proof should be adduced in answer to such contradictions as certain unscrupulous persons have put in practice in this controversy, I wrote to the Secretary of the Duke of Richmond to know from him what day the documents in question were dispatched by post to Sunderland, to which I received the following answer :

Cavendish Square, 18th Oct. 1831.

MY DEAR SIR GILBERT,

I have franked and forwarded the packets according to the enclosed list, and shall be most happy to frank as many as you may send me,

Believe me, my dear Sir Gilbert,
your's sincerely,

Sir Gilbert Blane.

RICHMOND.

One of the first passages in the Warnings consists in the following address to the clergy. "It is said somewhere that 'cleanliness is next to godliness,' which though not inculcated from the pulpit might be recommended by domiciliary visits lying admirably within the sphere of clerical duty. But if

brooms, mops and soap are objectionable on the score of dignity, the same cannot be said of Intemperance, for the censures of which no words can be found adequate ; for referable to this vice are not only the loss of health, premature death, and individual suffering, but idleness, sedition, and extinction of, and indifference to, all religious obligations and relative duties, as proved by the vicious application of wages imperfectly earned in consequence of the debility, ill health, and sloth induced by such habits, to allay the cravings of a depraved appetite, instead of providing bread for themselves and their families. And were not the disgraceful outrages, the delirious madness and wickedness which broke out this time last year, chiefly imputable to the same cause ? I allude to the destruction of human subsistence by fire, and of the renewal of which there is now some appearance.

Now what I mean, with the utmost humility and deference but earnestness, such as are due to those whom I address, the truly reverend and respectable body of the British Clergy, is to suggest what has been deeply imprinted on my own mind by my professional pursuits, that the excruciating sufferings attendant on the disease in question are such, that if inculcated with due gravity as a sanction of those persuasive admonitions which might be addressed to the labouring poor, it is impossible but that practical and efficient impression would be made on the fears of even the most ignorant and obdurate subjects. I am sensible that some apology is due on my part for this presumption, but a little explanation will I apprehend remove all cause of offence ; for without such information as medical men are alone qualified to furnish, Clergymen could not be aware of the power of the instrument which is put into their hands ; they could not be aware that this disease may, with truth, be painted as one which is, of all others, attended with such horrible torments, as adequately appreciated and described, may be deemed in effect of equal potency with the gallows as a dissuasive to

vice, certainly far more terrible than transportation for life. Very few indeed escape with their life; and temporal punishments have the advantage of proximity over those denounced in the life to come. The only palliating circumstance is the shortness of the interval between the attack and the grave. But how is this past? In the midst of health the enemy strikes like lightning, clings to the victim, inflicting the most exquisite torments, throwing the whole frame, limbs, body and vitals, into* convulsive and spasmodic sufferings, comparable only to the unutterable anguish said to be inflicted by the Inquisition. Of natural diseases the nearest approaching to it is probably one of rare occurrence named *Ileus* and *Miserere* in Latin, the *Iliac* passion in common parlance."

As great part of the confusion and error on this subject has been owing to the undefined import of words, therefore here I think it expedient to advert to this; for there is no law of ratiocination more conducive to perspicuity of language than that which recommends a definition of the words employed. In order to the clear understanding of the subject therefore, let us settle the exact import of the words *contagious* and *infectious*, *epidemic* and *endemic*. *Contagion* and *infection* I use as synonymous, but there is a term which embraces them both, by which all ambiguity and cavil are avoided, and which I therefore prefer; this word is *communicable*. Between the terms *epidemic* and *endemic* there is a distinction which cannot be mistaken. All the above-mentioned words apply to diseases prevalent at the same time in great communities. But *epidemic* ought to be applied only to those diseases which proceed from the breath, perspiration, and other exhalations emanating from

* In some rare cases the limbs are thrown into the most hideous convulsions a few hours after death, a circumstance not recorded in any case either ancient or modern.

living bodies under diseases, and thereby communicating the same disease to those who touch or approach them ; whereas, endemic diseases proceed from the exhalations of the soil or woods contaminating the whole atmosphere. As an example of the former may be quoted the plague and small pox ; of the latter, the agues of Zealand and Lincolnshire, and the Jungle fever of India. This is a distinction so evident that one wonders how the want of attention to it could have furnished whole volumes of sophistry and logomachy.

In accordance with this explanation it is clear that the words infection, contagion, and communicability, can alone be applied to epidemics properly so called ; for it has never been suspected that diseases caught by the breath from the atmosphere around us can communicate themselves from one person to another.*

But to return to the subject in hand. The next remark to be made in tracing its progress is, that after having reached Bombay it crossed the Deccan to Ceylon ; it was distinctly traceable to the Mauritius (otherwise called the Isle of France) in the *Topaze* Frigate, which sailed from Trincomalee with several cases of cholera on board, as already mentioned, four of whom died on a passage of 3000 miles. But as this has been a good deal the subject of controversy, the partisans of non-contagion having denied the truth of the statement made of it, and though refuted by the most undeniable evidence, taken from the surgeon's journal, they persisted repeatedly in quoting this mistatement in favour of their argument. In order to put an end to further perseverance in conduct so disgraceful as to make one blush for the profession, I have procured an authenticated literal extract from this journal, of which the following is a copy.

* It may indeed happen that these two remote causes may concur by the person being exposed to both, as in the case of the yellow fever of the Antilles.

Literal Extract from the Journal of H. M. S. Topaze.

As many of the sick as could be accommodated were sent to the naval hospital at Trincomalee on the ship's arrival there on the 5th of September, 1819. They amounted to 26, leaving 46 on board. Four of the cases of dysentery that were sent to the hospital relapsed there and died. Whilst in this harbour Robert Thomas, sailmaker, who had been employed working on board the hulk previous to his illness, and Charles Plato, marine, who attended in the Purser's Steward's room, and was exposed in that situation to sudden vicissitudes of temperature, died on board of Cholera Indica after a few hours illness, the former on the 16th, the latter on the 20th of September. Some others were attacked with this disease, but they recovered. David Pearce, seaman, a man formerly much employed in the hold, also died at this time, having had a relapse of dysentery. Permission could not be obtained of the commanding officer to inspect the body of the latter.

The ship being ordered to the Mauritius, all but one of the remaining sick belonging to her were embarked again from the hospital, under the impression that the change of climate would be beneficial to them, for but little essential improvement, if any, had taken place in a great number of them whilst on shore; the situation of the hospital is not considered favourable to recovery. The ship therefore sailed in this state from Trincomalee on the 9th of October, having 57 on her sick list, and immediately after Cholera Indica broke out and attacked 17, four of whom fell its victims, viz. William Smith and John Dixon, seamen, who had not completely recovered from Dysentery; the latter was one of the men returned from the hospital, and had been ill with hepatic and dysenteric symptoms ever since he was on shore watering, &c. at Sincapore three months before; James Cooper, seaman, an old man, sent on board by the civil power for smuggling, who was much depressed in mind and had suffered from scurvy on the passage from Manilla, and William Stewart, seaman, lately entered from a merchant ship. There died also on this passage to the Mauritius, Esau Sheldrake, ships corporal, of acute hepatitis, and Charles Farr, marine, of dysentery, the latter had been received in a hopeless state from the hospital.

On the arrival of the ship at the Mauritius on the 29th of October, all the sick that were confined to bed, in number 30, 15 of whom were of the number received from Trincomalee hospital, were comfortably accommodated at the military hospital at Port Louis, under the

care of the military medical officers. The remainder, with the convalescents, were placed in the quarters in Tonnelier Island, which were given up for their accommodation by the General Commanding. Six of the men sent to the military hospital died there, viz. Four of the sequelæ of Cholera Indica, with which disease they had been seized on board: one of these four had brought on enteritis by inconsiderate exertion and exposure on board when convalescent. The other two were long standing cases of dysentery. The whole six were of the number received ill with dysentery from Trincomalee hospital. Of the sick which were placed on shore on Tonnelier Island four died, who had been long ill, viz. John Thwaites, cook's mate, Philip Harvey, James Coffy, and Francis Lilly, seamen, all of them had recovered from dysentery and Cholera Indica a short time before, but remained extremely debilitated, and had a return of dysenteric symptoms, under which they sunk.

Three weeks after the arrival of the ship at Port Louis, the Cholera Indica made its appearance among the inhabitants, and continued to carry off, in Port Louis, from 50 to 60 persons daily, chiefly slaves. It appeared immediately afterwards in other quarters of the Island with equal fury. It was suspected by the inhabitants that the disease had been introduced by H. M. S. Topaze, for although the medical committee, composed both of English and French practitioners, had in their public Report declared the disease not to be contagious nor of foreign origin, yet some of the same French practitioners suffered the inhabitants still to entertain their suspicions, and even appeared to agree with them, notwithstanding their public declaration. The consternation was unbounded and nearly general. In consequence remonstrances were made against the ship being taken into the Trou-Fanfaron, the then only place of safety for a ship in the approaching hurricane months, and the wishes of the General commanding were acceded to by taking the ship into the Seychelle Islands, where she remained during the hurricane season. But previous to the departure from Port Louis six men were sent to the military hospital, being unfit to be carried to sea. Three of them, severe cases of dysentery, died there. One of the latter was of the number received on board from Trincomalee hospital ill of dysentery, and was afterwards seized with Cholera Indica on board. He recovered from both of these and became convalescent, but from irregularity in his diet relapsed. Dysentery still harrassed the ship's company during their stay at the Mauritius, but no case of Cholera occurred after her arrival there, although all the merchant vessels in the harbour were losing men by

this disease. The weather was warm and without rain. The thermometer ranged from 78° to 82°. The cases of dysentery were separated from the rest of the crew as soon as they appeared, by landing them on Tonnelier Island, under the care of Mr. Porteus, Assistant-Surgeon of this ship, to whose abilities and uncommon attention, these unfortunate men were indebted for their recovery.

Medical Department, Victualling Board, 29 May, 1832.	A true Extract from the Journal of Mr. Foy, Surgeon of Topaze, 31st May, 1820.
	JOHN BYNON, Chief Clerk.

It is difficult to conceive how any mind endowed with such a knowledge of the laws of evidence as belongs to the liberal and educated class of the British Nation can, after perusing these proofs, deny its communicable nature. Have they not seen it conveyed by human intercourse over continents, islands, seas, and oceans, even against periodical monsoons? Not in the straight lines and rapid motion of winds, but in the curvatures of human intercourse, high roads, rivers, canals, and voyages by seas, and oceans, through which we are required to believe that a certain portion of a contaminated atmosphere accompanies the moving body like a halo, yet though such numerous recantations of belief have been made of it, I am well assured that there are still some who maintain the contrary opinion. Whether this proceeds from ignorance or contumacy, they are objects of pity; for even on the supposition of a *bonâ fide* conviction of this belief, let us put the case that at some future period their eyes should be opened to their error, their feelings would be far from enviable. But if through culpable haste they had been the means of putting a single fellow creature so far off his guard as to expose himself to death (and such a death) what must then be their feelings! Further, if such persons may have been in authority, thereby giving a general sanction to such belief, it is questionable whether they would consider the mental pangs of having contributed to the destruction of so many myriads a less evil than that of falling by it.

It is to be hoped that this deplorable error is pretty generally eradicated in the British nation; and I have, from my own correspondence, as well as others, and our Government, through Lord Heytesbury, the British Minister at St. Petersburg, authentic intelligence of the like happy conversion on the continent. My last information was from Professor Moll, of Utrecht, one of the most eminent mathematicians and natural philosophers in Europe, and well known as a member and contributor to the Transactions of our Royal Society. With his eyes full of tears he laments the past prevalence of this error, concluding his letter to me as follows: "Dr. Rust, of Berlin, a man of very great reputation and who enjoys the well merited confidence of his government, has published a very interesting letter to the celebrated Humboldt, in which he asserts the contagious nature of the disease by such arguments that one must wilfully shut his eyes to the clearest evidence if he is not convinced by them. The venerable veteran, Baron Hufeland, is one of the same opinion. So that it would appear that in general the learned, the experienced, and the old, maintain the malady to be contagious, while the young, the inexperienced, and the theorists, adopt the contrary opinion. Utrecht, 17th May, 1832."

This picture of the opinion on this question may be viewed as a *fac-simile* of the same on the rest of the continent of Europe and in England. But such is the misleading operation of panic on the community at large, by rendering them sensitive to every emotion of danger, particularly of such a frightful nature, that a single discordant opinion of any one however ignorant, makes a serious impression on the multitude, as was the case at Utrecht in consequence of the promulgated opinion of two young medical men of that city, whose reckless flippancy has in some measure unhinged the public mind.

It is worth remarking, that some of the most obdurate of

the non-contagionists, such as a medical gentleman of high rank, who was at the head of that sect in Bengal, (which being the seat of the supreme government, it was to be regretted that it adhered longest of any to the erroneous opinion,) had the great candor to declare officially, after his arrival as a member of a mission to St. Petersburg, that he had changed his opinion.

Regarding the general opinion on the continent, the declarations of the orthodox side are so many, that to enumerate them would fill a sheet. I shall only further add the example of Russia, where in consequence of the slow progress of the disease founded on the opinion of contagion, it was seven years in making its way from Astrachan to St. Petersburg, having been introduced into the former in 1823, into the latter in 1831, and so well convinced of it was the Emperor, that in making a tour for its suppression, he underwent a quarantine before entering one of its great cities, (Twer), and succeeded through appropriate measures in averting the calamity from his capital for so much a later period than the rest of the empire. Such is the great inequality with which it assails different nations, affording a proof of the efficacy of quarantine and other means of separation.*

Next to the introduction of it through Astrachan, the most pernicious vehicles of it were two great fairs, that of Orenberg, on the confines of Siberia, to which 6000 camels annually transport the commodities of China, India, and the rest of Asia, into Russia, and that of Nijniny Novogorod, in the centre of the empire, to which 100,000 merchants resort annually in the month of July.

* Among the innumerable evidences of the virtue of strict separation, there is none more irresistible than its exclusion from a town called Serepla, near the mouth of the Wolga, by the vigorous exertions of the English Methodists settled there, while it prevailed in the whole surrounding country; of fifty physicians in Petersburg, forty-eight were believers in contagion.

At this part of my labour I feel myself under the necessity of apologizing to my readers for not concluding the subject in that methodical and coherent order which I wish, nor with that attention to style which respect for the Public ought to dictate. My great age, my suddenly declining state of health, and very precarious duration of life, considerations also of the probable and speedy return of the malady, compel me to lose no time in publishing the remaining part of what has been the subject of my intense study for the last eight months.

I hasten now therefore to throw together my thoughts on the theory of this disease. For, although I am unfriendly to what is commonly called theory, I have found occasionally much light thrown upon practice by rational and philosophical views of medical subjects.

In a work of mine, first published in the year 1819, and which has since undergone two editions, I have attempted a new arrangement of those properties of life which have nothing in common with those of inanimate matter. The two most conspicuous phenomena of the Indian Cholera are an enormous discharge of a peculiar fluid from the bowels and stomach, and an intense sensation of cold, both to the patient and to those who come in contact with him, as proved by the feeling of the tongue, lips, and breath. I account for the former upon my system by referring it to an excess of absorption, the whole of the absorbent vessels being thrown into an excess of action, whereby like millions of pumps, they evacuate not only the whole interstitial fluid of the cellular membrane but the adipose follicles; pouring their contents into the bowels, like the operation of a drastic dose of elaterium; and the fluid evacuated is exactly such as might be expected from a mixture of serum and *adepts*, being a sort of emulsion like rice gruel, and the * Principle of which is a morbid action of what I have called the Formative, being

* See Elements of Medical Logic, p. 33, 3rd Edition.

the chief instrument by which the growth and moulding of living beings are carried on. The natural effects of these preternatural processes are (what is actually observed,) a sudden emaciation, extenuation, and great shrinking of the volume of the whole body. The other phenomenon, consisting in the extinction of heat, is evidently a cessation of a Principle which I have called the Temperative, and which I have stated as one of the main constituents of life itself. Other phenomena might be explained by a reference to other principles of life, such as the dereliction of that sympathetic influence, a principle by which all the functions and organs harmonise and act in concert with each other. But enough having been said as far as regards mere theory, I shall not pursue it further, although it clearly appears, as I have said, that these theoretical views suggest useful points of practice, for the restoration of heat forms one of the main indications in the practical treatment next to be considered.

TREATMENT OF THE INDIAN CHOLERA.

In the midst of such a horrific mass of misery there is some consolation in reflecting that means have been found, by the prompt, early and immediate application of which, the disease may almost infallibly be arrested in its onset. Lord Hastings informed me that the disease having unambiguously attacked him, it was efficiently arrested by a single dose of tincture of rhubarb. This, however, ought not to be a general rule in ordinary cases, for the salutary effect would have been more certainly produced by combining from half a drachm to a drachm of laudanum, (a small teaspoonful) to be repeated at such intervals as the judgment of the attendants may decide. Opium may be considered upon the whole, as the most useful of all the remedies in this disease, inasmuch as it not only stays the excruciating cramps now approaching, but enables the stomach to bear a larger quantity of the tincture of rhubarb or calomel, by prevent-

ing their over-purging, and what is of great importance it operates as an exhilarant, a great depression of spirits, or what is called collapse, being one of the most distressing symptoms. But what is mainly now to be kept in view is the revival of the extinguished power of generating heat. The obvious means of effecting this, is without a moment's delay to place the patient before a large fire, rubbing him with blankets as hot as can be borne, or wrung out of hot water and sprinkled with oil of turpentine. There ought also to be combined with tincture of rhubarb, some strong aromatics, such as tincture of ginger, compound spirits of Lavender, or of ammonia, commonly called salvolatile, or oil of turpentine two drams. And if there should be a defect of these, let powders of the same ingredient be substituted, that of ginger as far as 30 or 40 grains, capsicum (cayenne pepper) as far as four or five grains. If these measures are rapidly and energetically put in practice, a very great majority of lives would be saved. Should they fail, the next step to be taken is blood-letting, in order to remove the accumulated mass of black thick unoxygenated blood lodged in the venous system and clogging the circulation. The good effect of this is frequently very striking, but should it be followed by disappointment there are still powerful remedies in reserve; calomel from 10 to 20 grains, accompanied by laudanum, the dose of which to be regulated by what has been previously administered.

As this tract was intended chiefly for those not belonging to the profession, the author has studied to confine his list of remedies as much as possible to those which are found in most families as culinary articles, and any further details may be reserved for the arrival of a professional person. The remedies therefore which every family under the influence of alarm ought to be provided with, are tincture of rhubarb, laudanum, sal volatile, compound spirit of lavender, calomel in packets of 10 or 20 grains, oils of peppermint and

turpentine, powdered ginger and capsicum. The warm bath has not in general been well thought of.

I shall conclude with a short account of the present progress of this epidemic on the continent and England, with the addition of some detached observations and documents.

The principal historical facts till the year 1822, have been sufficiently adverted to, since that time the scenes of its ravages have been through those inlets of the Indian Ocean which have directly or indirectly led it through the Persian Gulph, the Red Sea, the Caspian and Black Seas, the great rivers Wolga, Don or Dwina, into the civilized districts of Europe, until through the Baltic Sea, the Elbe, and the Weser, it reached the ports of the German Ocean, from whence it was conveyed to the shores of Britain. All this has been already so circumstantially noticed, that the great interest belonging to this research, regards only the introduction and spread of it into Great Britain and Ireland, and what the author means to confine his attention to, is to concentrate the evidence in proof of the culpable conduct of the people of Sunderland; for there cannot be a doubt that the introduction and future extension of it was owing to the unwarrantable conduct of that self-constituted Board of Health, by which those precautions were frustrated, hitherto practised with so much success on the continent and till then in the ports of England. The subjoined certificate from the Secretary of the Duke of Richmond, put it beyond a doubt that the Warning and Admonitions addressed to the Magistracy of Sunderland, had arrived in sufficient time to have prevented those hasty and deleterious measures which produced the whole mischief, for before the proper measures had been restored, the epidemic had reached Newcastle on the 7th of December, Glasgow on the 12th of February, Belfast, on the 12th of March, Dublin, on the 27th of March; and it appears that it hath spread more extensively into the interior of Ireland, and even to its western coast, than any

other parts of the British dominions, owing probably to the extremely squalid modes of life of the peasantry of that country.

In conclusion I cannot refrain from subjoining the following statements and reflections, remarkable for their clearness and cogency. “That whatever may be our aversion to controversy, every good man ought to contribute all in his power to oppose the deplorable effects of such masses of sophistry, mis-statements, and manifestations of party-spirit, as tend to mislead and pervert the public mind. One of the untruths so industriously propagated, is that none are attacked but the poor, squalid and destitute part of the community. Whatever truth there is *in* this is equally applicable to *all epidemics*, but the contrary is most wofully exemplified *by its* having entered the palaces of native Princes, Governors General, Members of Supreme Councils. The beloved and admired Sir T. Munro was one of its victims, also Persian Satraps, Russian and Polish Generals, Ambassadors, and the attendants on the sick, have perished in numbers, in proportions incredibly greater than other persons, as appears by the most authentic evidence. It attacks they say a single spot, while the neighbouring population escapes, but do you not see small-pox prevail in one side of a street while the other is exempt, and in God’s name, what explanation does this afford of the favourite doctrine of atmospheric influence? Does not the atmosphere pervade one side of the street as well as the other, all breathing the same air? One moment’s reflection on any thing so easily comprehended, or so irresistibly convincing, ought to sweep away such nonsense for ever, and it is of all things the most disgraceful to the profession, to admit the spirit of party to enter into such a question. It is so difficult to be accounted for, and such is the inscrutability of human motives, that no one has been able to assign any other as a better incentive to it than that of a morbid pruriency for notoriety. Let us ask

these gentlemen what they find in common on the banks of the Ganges, the Wolga, and the Dwina, with the burning sands of Asia, and the snowy mountains on the confines of Siberia. To assert this is as absurd as asserting that it has no cause at all. They say where should we find it but where men are found for its food? but I will tell them that an atmospheric epidemic flies on the wings of the wind, is not confined to the high road, nor to the sluggish motion of a boat along a canal, but moves with the rapidity of thought; were it not so should we not see it irresistibly and rapidly sweeping with immeasurable speed from India to China, Russia, Poland, and the shores of the Baltic. Such would be the history of an atmospheric cholera; such is *not* the history of the cholera which now appals the world.

And what do they propose as a prophylactic? Not to be afraid! Fear being the creator and propagator of it; which reminds one of the saying of a young and gay French gentleman conversing with an * Englishman in bad health: “Vous autres Anglais deviennent mal-sains à force de trop penser. J’ai pense autrefois moi-meme, mais les medecins me l’ont defendu.”

It has already been mentioned how singularly the British islands have been favoured by the slow and imperfect progress which the disease has made in this country compared to all others. Towards the end of May it became so stationary that regular reports ceased to be issued.

* Lord North, the minister of the American war, when on his tour of Europe, customary with all young men of rank at that time.

END OF VOL. I.

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